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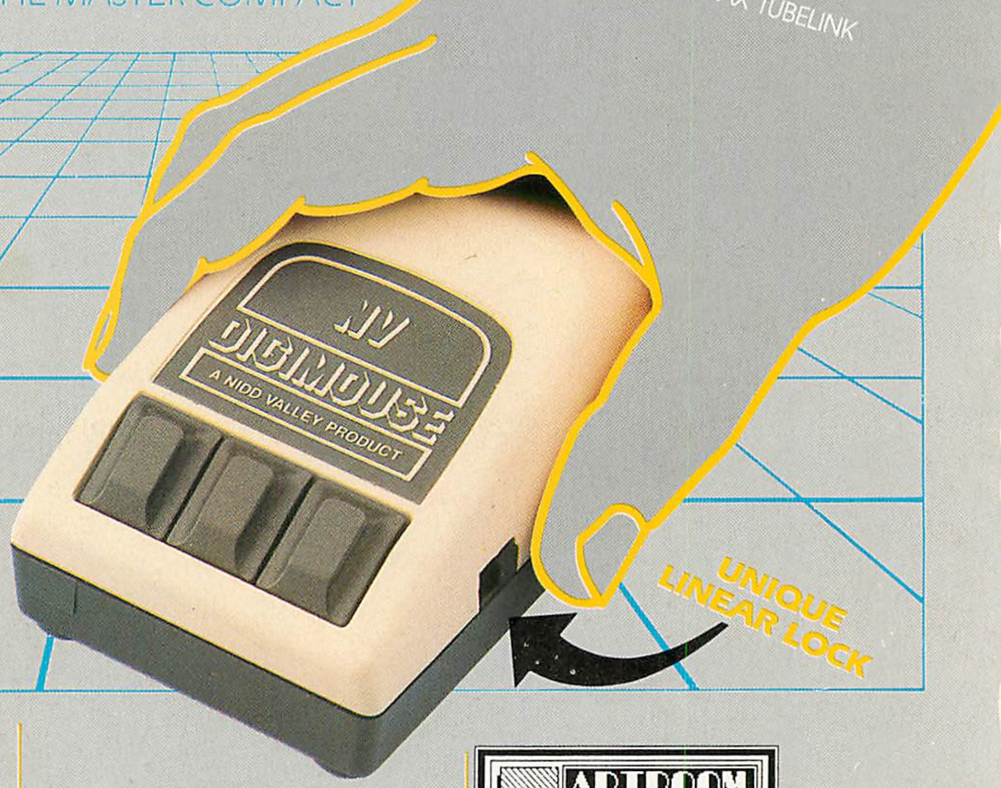
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ACORN USER

ISSUE No 53 DECEMBER 1986

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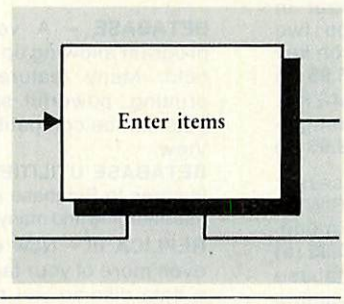
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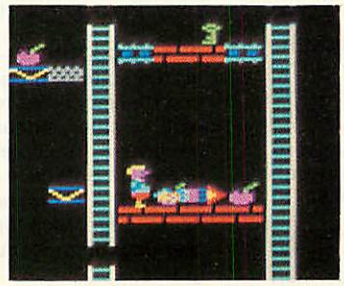
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99
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175
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COVER



Cover illustration
by Edward Briant

NEXT MONTH

Kiddie Art introduces children to computer graphics
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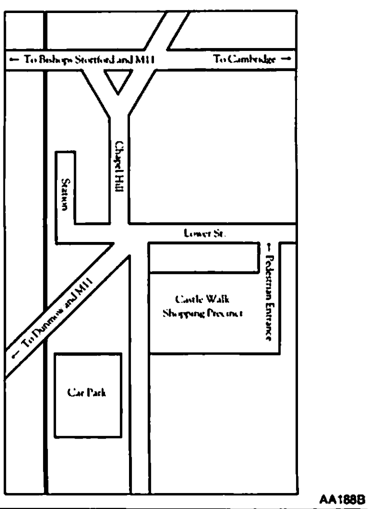
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NEWS

Comms come to Acorn User

Acorn User is to launch a regular communications column next month covering Prestel, Telecom Gold, TTNS and the like. If you have anything to tell us, write to 'Buzby', *Acorn User*, 141-143 Drury Lane, London WC2B 5TF.

In the meantime, here's some of the latest tit-bits:

- Telecom Gold users who have joined via MicroLink can get the most out of it by obtaining the official manuals – just type REQUEST MANUALS at the chevron › prompt.
- The demise of Prestel-based information provider Timefame has left many 'Micro-Board' fanatics unhappy. However, Timefame is to open up its own dial-up service.

Users may be worried about non-local call costs, but when BT install new technology, more private databases will be able to share their services nationally at all baud rates.

Living on the now rather low-tech Prestel system is expensive, and this new facility may indeed lead to more information providers starting off-Prestel databases.

- Prestel's promised keyword searching is now going through its final testing stages. Several Prestel users have already encountered completely unexpected messages.
- Compunet, the multi-user system for Commodore users, will be opening its lines to the Beeb world, producing a dedicated comms package.

Compunet takes advantage of the Commodre 64's sophisticated text manipulation and graphics which the Beeb software will have to allow for. Compunet electronic mail is comparable to Telecom Gold.

Buzby

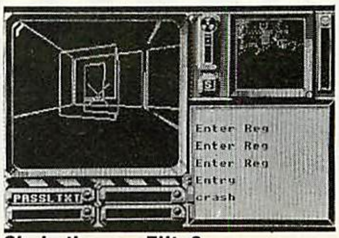
Software battle for Christmas

Superior and Firebird will be fighting it out for the number one BBC spot this Christmas, with a clutch of new games.

Firebird sees its *Cholo* as the new *Elite*, with similar wireframe graphics in an adventure format. But Superior has *Repton 3* to continue the huge success of this Tim Tyler ladder and platform series.

Repton 3 features the mind-damaging puzzles of the first two, with the ability to build up your own vesion of the screens and creatures. There are 24 screens and ideas to hurry you up such as a time bomb and a growing fungus.

And both companies have other titles to bolster their sales. Superior's *Stryker's Run* has amazing graphics and the ability to make use of the extra memory of the Master. The BBC and Master versions come on the same tape or disc.



Cholo*: the new *Elite?



***Stryker's Run*: great graphics**

Sentinel from Firebird is a 3D strategy arcade game by Geoff Crammond, who did *Revs* and *Aviator*. The graphics are produced by fractal routines and there are 10,000 levels to get through!

Meanwhile Tynesoft is continuing to build its reputation among Electron owners with a series of low-cost releases. Martech has a graphic adventure for BBC micro and Electron: the player is Tarzan and rescues Jane from the hostile natives. A real swinger at £8.95.

Many of the batch of promised titles for the Compact failed to appear at the launch, but these are now coming on stream in the 3.5in disc format. Superior's compilation of Acornsoft's games and BBC Soft's *White Knight* chess should be in the shops.

Prices are still just under £10. Superior's are £9.95 for tape, £11.95 for BBC disc and £3 more for Compact versions.

CAD and CAM software

Edusoft has released computer aided design and computer aided manufacturing packages for schools or business users.

Educad allows the construction of diagrams and figures, and gives hard copy with printer dumps off screen. It costs £92. Educnc is the CAM package and provides tool paths and profile definitions from Educad designs. It has a general numerical control processor for direct links to machining tools and costs £39. Edusoft, 15 Tamworth Business Centre, Amber Close, Amington, Tamworth, Staffs, B77 4DS.

Mouse with art package

ATPL is selling a mouse packaged with art software. Mousepac costs £55.20, for mouse, control software on chip and art program on two discs.

It is compatible with screens from AMX software, and runs on the BBC micros (B, B+) and Master. A version for the Compact is due. Contact ATPL, Station Road, Clowne, Chesterfield S43 4AB.

Program checks AU listings

Readers who have problems typing in listings can send for a free copy of checksums for this month's issue.

Simply run the special program provided to give you a series of numbers relating to the number of characters in each line of a listing. If these don't tally with the printed checksums, then you can tell which lines are at fault.

Just send a large self-addressed envelope with a 24p stamp to: *Acorn User* Checksums, PO Box 641, London NW9 8TF.

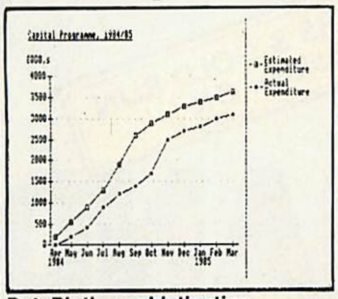


Still in the Castle

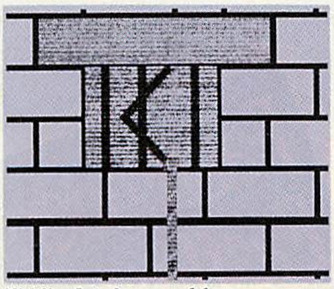
Next month

Start the New Year the way you mean to go on and order next month's *AU* right away.

The Nightmare continues as Mark de Weger shows how to design your own screens for use with this month's block busting game. Peter Sandford returns with the program that so many of you have asked for, *DataPlot*, a sophisticated graph plotting program comparable to packages costing tens of pounds. *Kiddie Art* is a superbly easy to use graphics program for all the family. David Atherton shows Compact owners how to perform the serial upgrade and dial into a Bulletin board, and how to transfer programs cheaply from 5.25in to 3.5in disc. David Lawrence presents instant pull down windows. And we take you on a tour around the new Superior Software blockbuster *Strykers Run!* Plus all your regulars.



DataPlot's sophistication



Kiddie Art: hours of fun

Network managers demand more time

A plea for more of teachers' time to be allocated to network management was repeated by several speakers at the Econet Conference last month.

This was highlighted by George Hawes of Brackenhale School. He said that networks in Berkshire schools were allocated at most five per cent of one person's time. The annual running cost was £100-£700, with most schools spending less than £300.

High cost

The conference began with Colin Monson, Berkshire's computing adviser, taking Acorn to task about the cost of Econet software. He claimed the charges for network licences were 'totally unreasonable'. This was later hotly contested by the software writers.

Colin Monson also called for the establishment of standards for teaching computing, and stressed the need to publicise the role of network managers.

Three speakers took networking onto another plane. Chris Dawkins showed what could be done by 'immersing' pupils in computers, with electronic noticeboards used by everyone from the head down, 45 micros, 2.5km of cable, one and half people to look after it all and £15,000 a year to spend.

Acorn's Lawrence Hardwick discussed the esoteric: ISDN, X25, X21, IDA and Kilostream linking networks into telephone systems. Kim Spence-Jones of SJ Research took the opportunity to 'launch' Streamline, an electronic mail system, designed to run with auto dial and answer modems overnight, saving phone charges.

Nets in use

Acorn User's David Acton explained how Redwood Publishing produces more than 500,000 magazines a month without a typewriter in the building. He also took a swipe at how difficult some programs and Econet itself were to use.

Practical talks came from George Hawes, Robin Newman of Oundle School (who demonstrated four BBC micros playing music synchronised across the network), and Andrew Gordon from SJ.

Copies of the talks are available from ME Electronics, 5 Hatherley Rd, Reading, Berkshire RG1 5QA.

Micros root out those family trees

A survey by the Society of Genealogists has revealed that 35 per cent of its members using a computer have a BBC micro. The SoG 1000 subscribers to its 'Computers in Genealogy' newsletter, using 329 different machines.

Don Francis, a major contributor to the newsletter, conducted the survey and said the BBC micro had become the 'model T micro of the genealogy world'.

With the help of his Master, Don Francis has traced all lines of his family tree back to 1562 and has over 40 discs of ancestral records. He said 'anyone who has a micro and is interested in family history cannot resist putting it to use'.

Most genealogists have used Bel Tech's *Belgen* software, but now the SoG has commissioned Bel Tech to write a more suitable program, *Heritage*, due in the new year.

Heritage is a database and runs on the B, B+ and Master with DFS and ADFS. It offers up to 1500 records with variable length fields. The program offers search facilities and can even print out family trees. It is compatible with *Wordwise* and *View* and with data from *Belgen*. It will cost £30.

Most importantly, *Heritage* can use and produce data in the 'Gedcom' standard for the Mormon Church's mainframe facilities in Salt Lake City, which hold over 10 million records and provide an important source of genealogical data.

Logo of SoG, founded in 1911

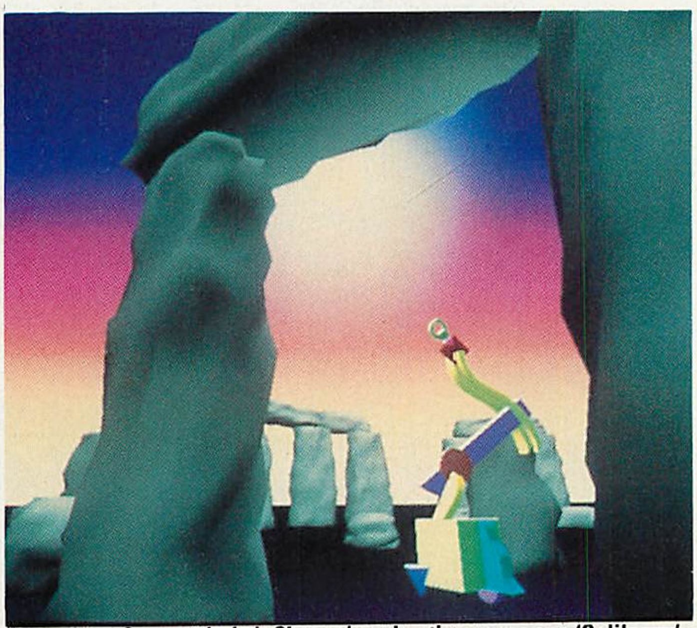
The SoG has 9000 members and publishes a quarterly magazine. The 'Computers in Genealogy' newsletter costs £5 a year with £1 discount to members of the SoG or the British Computer Society. Contact the Society of Genealogists, 14 Charterhouse Buildings, Goswell Road, London, EC1M 7BA.

Graphics prize

A British student has won first prize in the Art Show at the international computer graphics exhibition, Eurographics, in Lisbon, Portugal.

Semannia Luk Cheung, a postgraduate studying Computer Animation at Middlesex Polytechnic, received the prize for a frame from her animation sequence 'Soliloquy' of a robt dancing at Stonehenge. The complete work has been exhibited in Australia and the USA.

Picaso and *Prism* software was used VAX mainframes. Inspiration for all you budding Beeb artists!



Frame from Semmania Luk Cheung's animation sequence 'Soliloquy'

Master 'recall'

Acorn is still waiting to hear from owners of Masters purchased before June 1, who have not had the battery replaced.

Acorn 'recalled' all Masters sold before then after identifying a possible problem with the Lithium batteries in early models. Dealers will replace battery packs free of charge.

Anyone who hasn't, should therefore contact as soon as possible the dealer where the Master was purchased. Dealers who have carried out this service are asked to return to Acorn the special forms giving details as soon as possible.

Database for child care

Management Data Systems (MDS) is developing for child care monitoring a version of its MPSS database software.

This follows the success of both its £300 Juvenile Justice Monitoring System, which has analysis features which have been helping local authorities modify policies and cut costs, and the original MPSS, which was introduced three years ago.

A number of schools use MPSS for administration, one having even set up a complete database to store and correlate academic profiles, personal profiles, careers information and private records for every pupil in the school.

MPSS is a powerful database costing £115 which runs on a standard BBC micro. It uses up to four disc surfaces for a single file, so can create files of up to 7000 records each with 100 characters. By searching 20 fields at once, access time to a record is typically just one second. It is also a statistics generator, using a macro language to produce tables of comparative data throughout a file.

Contact Management Data Systems, 108 Parthenon Drive, Liverpool L11 7AQ.

Electron runs RISC chip

by Geoff Baines

Advanced Computer products (ACP) has set out to bring the Electron up to full BBC micro specification, by way of its Plus 5, which plugs into one cartridge slot in Acorn's Plus 1 and provides Tube, 1MHz bus and user port interfaces.

This fulfils a promise made by Acorn, who have now largely abandoned the Electron, at the machine's launch.

The Plus 5 also has two free sockets for ROM chips and a third for the software to run the interfaces. ACP says the Plus 5 can control most addons for these interfaces on a BBC micro, including 1MHz bus add-ons, and claims the Acorn 6502 and Z80 second processors work perfectly. In fact, the company has demonstrated an Electron using the Plus 5 Tube interface running Acorn's prorotype RISC (reduced instruction set computer) second processor – costing around £4000.

More affordably, ACP is selling for £69 a version of the AMX mouse package with AMX Art, adapted as the Plus 5 user port is at a different memory location to the original Beeb version. The other AMX packages are being adapted and so possibly are the Grafpad and a robotics package.

The Plus 5 costs £66.70 from ACP, 6 Ava House, High Street, Chobham, Surrey, GU24 8LZ.

Bulletin for MIDI

The Access bulletin board covers most computer subjects and has a section on computers used with MIDI musical instruments. It runs 24 hours a day, seven days a week on (0905) 52536. Initial access to Access is free but up to five levels of priveledged access are available for £1 a time.

Spider

In the October issue of *Acorn User*, an article by David Johnson-Davies and David Deutsch was published describing a curve-plotting program under the title 'Spider Power'. The term 'Spider' is used by Paul Fray Ltd of Cambridge as a trademark for a range of realtime control products for the BBC and Master micros. *Acorn User* would like to apologise for any confusion caused by the use of the term 'Spider'.

Specialists link up on Enthusinet

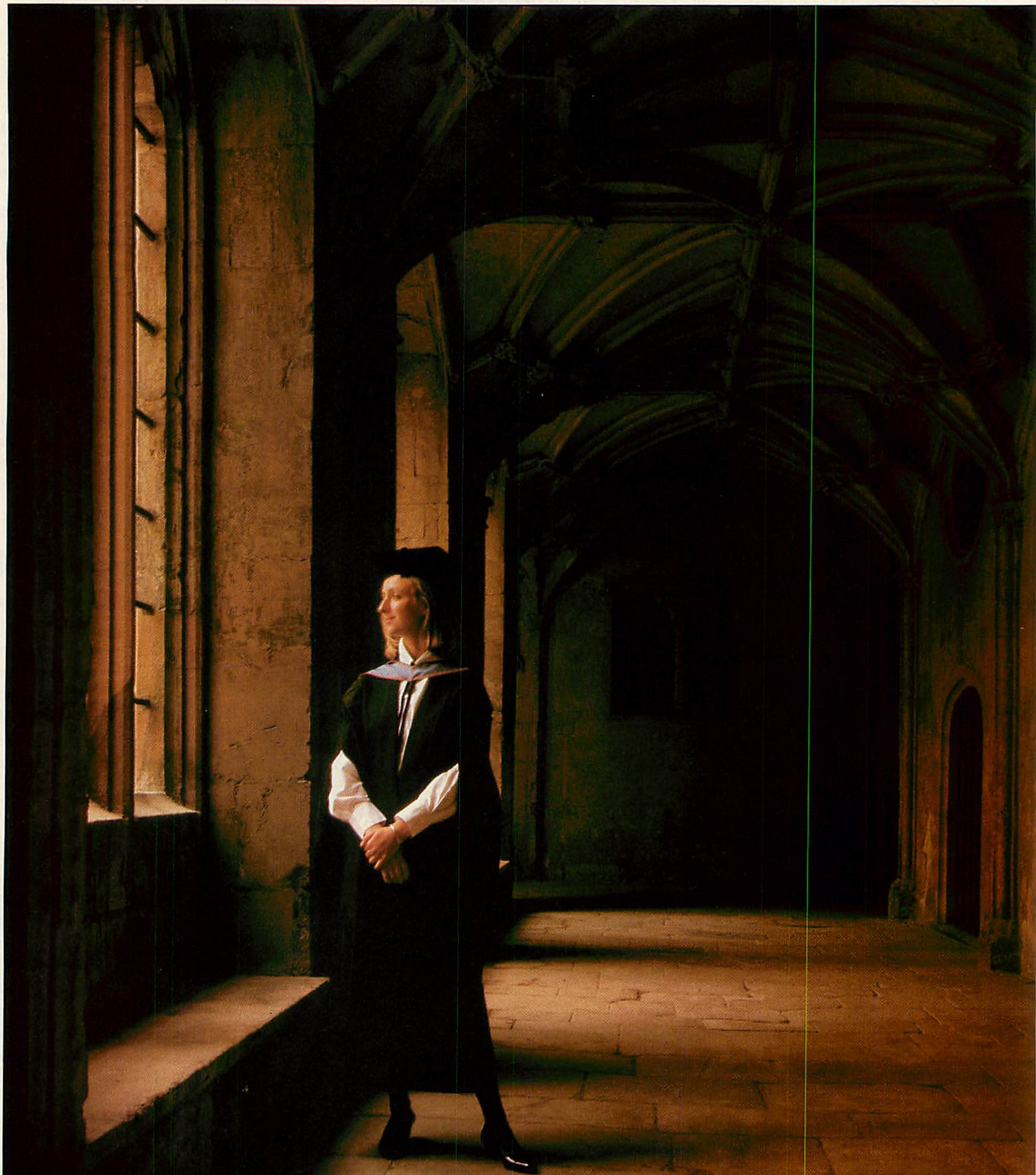
BBC micro users with nowhere to turn for advice can now try Enthusinet.

Set up by Marlboro' Computer Services, it aims to put users in touch with a nationwide chain of local specialists in just about every aspect of using a BBC micro and peripherals.

Wordprocessing, newssheet design, fault diagnosis, EPROM blowing and graphics are all covered, and Enthusinet offers local demonstrations for software and hardware.

Enthusinet is looking for specialists to join the organisation, who pay a yearly subscription and negotiate with the users for individual fees.

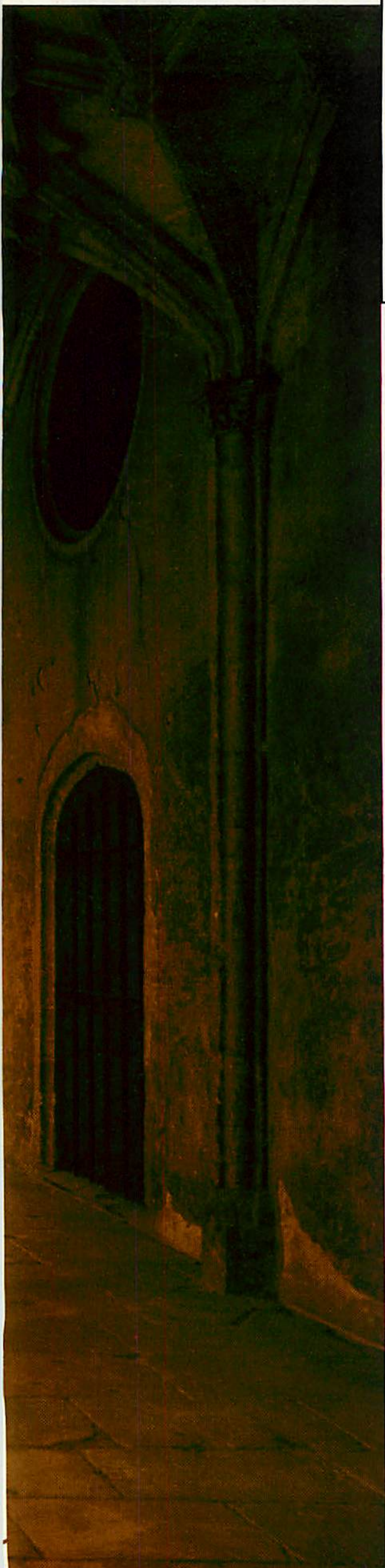
Contact Enthusinet, Marlboro' Computer Services, Upper Springfield Road, Uplands, Stroud, GL5 1SN.



Compact
BRITISH BROADCASTING CORPORATION
MASTER SERIES MICROCOMPUTER

AU3

The BBC Master Compact



The BBC Master Compact. Think of it as a down payment on your child's future uniform.

Your child's degree ceremony may seem a long way off.

But the BBC Master Compact is equipped to help at every step of the way.

Firstly, the Master Compact is compatible with the BBC micro they are likely to be using at school.

A distinct advantage when it comes to gaining confidence with computers.

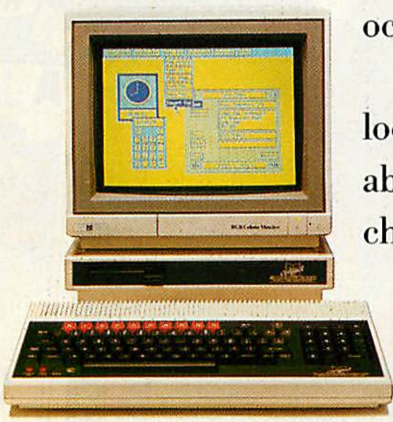
Our new micro can provide your child with constant support throughout education, eventually graduating onto business and professional use.

For example, the Master Compact's wordprocessing power could help many aspiring novelists to produce their first literary masterpiece.

Our wordprocessing package has already proved popular with over 100,000 users.

The BBC Master Compact fits the BBC micro's benefits into a complete, easy to use package.

This includes colour monitor, processor, disc drive and enough practical software to keep you and your children occupied indefinitely.



Why not have a chat with your local Acorn dealer or specialist retailer about the computer that equips your child for life.

Put it on your Christmas list. It should help put a few letters after your child's name.

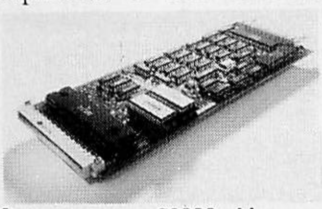
THE MASTER COMPACT 128K RAM, 3.5" DISC DRIVE, PRINTER AND JOYSTICK INTERFACE. SOFTWARE INCLUDES VIEW WORD PROCESSOR, ABC, CARD INDEX, LOGOTRON LOGO, WINDOW-DRIVEN DESK-TOP SYSTEM, ADVANCED DISC FILING SYSTEM, 14 PROGRAM WELCOME PACK AND 4 TUTORIALS. BASIC PRICE £399. WITH MONOCHROME MONITOR, £469. WITH HIGH RESOLUTION (0.42 PITCH) COLOUR MONITOR (AS ABOVE) £599. ALL PRICES PLUS VAT. FULL DETAILS FROM BOB COATES, DEPT AU3, ACORN COMPUTERS LTD., CAMBRIDGE TECHNOPARK, 645 NEWMARKET ROAD, CAMBRIDGE CB5 8PD.

t. Equips your child for life.

Acorn
The choice of experience.

News in brief

● CA Special Products make a 68000 second processor for the BBC micro. The £299 Casper board has 128K RAM and a eurocard connector for further expansion. A 32K EPROM allows assembler programs to be written and transferred between Beeb and 68000 board. CA Special Products, Moss Way, Donibristle Industrial Estate, Dunfermline KY11 5JW.



Casper: uses a 68000 chip

● *Acorn User* and *School Computer User* will be represented at the third High Technology and Equipment in Education exhibition at the Barbican Centre, London on 21-24 January. EMAP Exhibitions, 34 Farringdon Lane, London EC1R 3AU.

● Logotron has a £15 interactive games generator to accompany the £34 *Pendown* word processor. Like *Pendown* it is aimed at children. Contact Logotron, Dales Brewery, Gwydir Street, Cambridge CB1 2LJ.

● Resource has launched the first hardware add-on for the Compact allowing hardware that uses the user port on the Beeb or Master 128 to work with the Compact. It costs £14.95 from Resource, Exeter Road, Doncaster DN2 4PY.

The price of Acorn User has increased by 5p to £1.30 this month as we have been forced to pass on part of the seven per cent rise in paper costs caused by the fall of Sterling. Subscription prices remain unchanged. Just think of the quality, feel the width, and look at the goodies coming up (see page 9). Compare Acorn User to the rest – there's still no better value.

Flight plan program set to take off



Take off time reduced by Ian Fisher's program

There may soon be a BBC micro at every airfield in the country thanks to Ian Fisher, a Beeb owner and qualified private pilot. He has written a program to cut out the tedious and time-wasting calculations every pilot must complete before take-off.

Magnetic headings and flight times must be calculated for each leg of every journey according to the wind conditions predicted. This is currently done with a map, weather forecast and a slide rule and can take half an hour.

Using Ian's software, a pilot need only enter the waypoints (turning points identified as landmarks on the ground) in latitude and longitude, or as a series of internationally recognised codes for airfields and radio beacons.

A couple of seconds is all the Beeb needs to make the calculations. The flight information is then displayed on the screen and printout produced for the cockpit. The program is based on similar software running on IBM PCs at US airfields, and took two years to write.

When it was shown to the CSE Aviation flying school in Kiddlington, the instructors there were so impressed they thought it would be worth airfields and air taxi services buying a BBC micro system just to run Ian's program.

It is now being marketed by Paean Systems as *Flight Plan II*, supplied complete with a database of radio beacon and airfield locations. Versions for European countries and Australasia are available. *Flight Plan II* costs £35 from Paean Systems, Little Bealings, Woodbridge, Suffolk IP13 6LT. Tel: (0473) 623757.

For pilots still on the ground, *Micro Nav* is a training package for instrument flying. Essentially a flight simulator, *Micro Nav* accurately reproduces a plane's instrument panel and flight conditions.

It costs £28. Contact Micro Nav, PO Box 24, Wokingham, Berkshire RG11 5BW.

AU in British Council push

Overseas readers can now see their favourite magazine at British Council offices in more than 80 countries.

The Council promotes British culture and technology abroad and has chosen *Acorn User* to accompany its push of the BBC micro and software in other countries.

Copies of *Acorn User* will be available in the libraries and exhibition centres in British Council offices worldwide. Each month's issue will appear at the Council's offices before going on sale in local shops.

Of course, the best way for overseas readers to ensure they get *Acorn User* regularly on time each month is to take out a subscription. Details of this are available at British Council offices too.

Musical bulletin board network

A novel way to organise some of the countless bulletin boards has been set up by Musictel, by incorporating them into their Network. Callers to any board can send messages to others without phoning long distances or hunting out other boards.

At present the connection between the boards is via the services of British Telecom, but Musictel plans to handle this itself within a couple of years. The system is paid for by advertising, with free access.

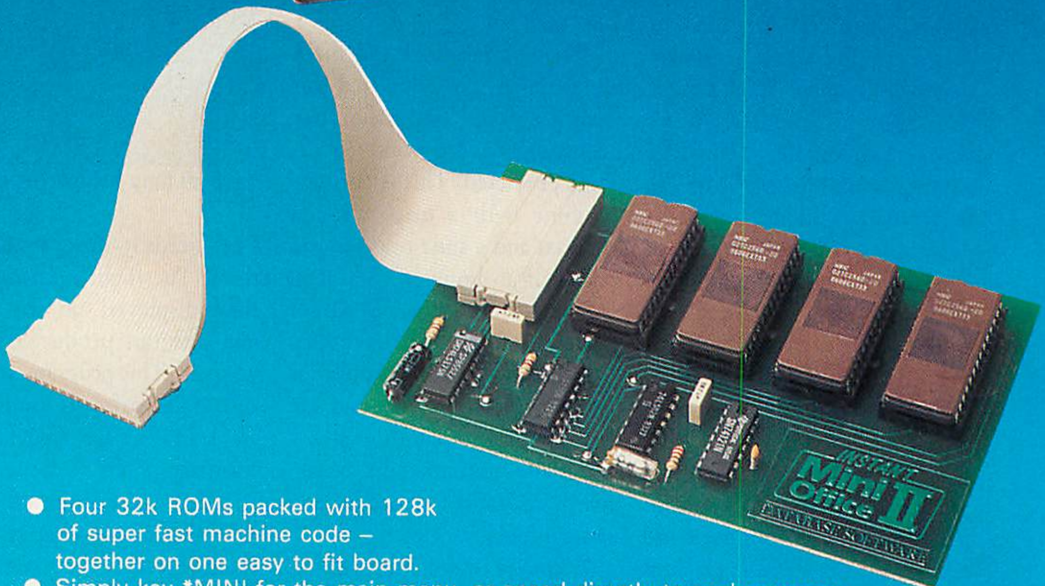
The Musictel bulletin boards are biased towards music, instruments and other subjects for musicians.

For details and to find the number of your local Network board, phone the main board. It operates at 300/300 or 1200/75 on 01-455 0843.

INSTANT



Now on a power-packed ROM board – the BBC Micro's top-selling 6-in-1 package. Included in it are all the highly-acclaimed features of Mini Office II . . . plus many exciting extras.



INSTANT WORD PROCESSOR

Memory can hold up to 3,600 extra words. Text can be entered in 20 (enlarged), 40 or 80 column modes. New embedded commands for Epson compatible printers.

INSTANT DATABASE

Room for an additional 150 average-sized records in RAM. Total capacity only limited by disc space.

INSTANT SPREADSHEET

Provides 3000 extra cells, plus many more maths functions. Can run 40 or 80 column format.

INSTANT COMMUNICATIONS

Bigger buffer capacity means much longer text files can occupy the BBC Micro's memory for uploading or downloading text.

INSTANT GRAPHICS

Speedier switching to and from spreadsheet to create or amend bar charts, line graphs and pie charts with ease.

INSTANT LABEL PRINTER

Labels prepared in the database can be quickly output in any format onto sticky labels

The original Mini Office II is still available on tape and disc. Existing owners of tape or disc versions can exchange them for Instant Mini Office and save £8. See the coupon alongside.

- Four 32k ROMs packed with 128k of super fast machine code – together on one easy to fit board.
- Simply key *MINI for the main menu, or speed directly to each program by keying *WP, *SP, *DB and so on.
- Switch from one application to another in a split second.
- Frees valuable RAM space for much more data.
- No need to swap discs if you've only one drive.
- Easy to install – slots into any sideways RAM socket.
- Works with Aries or Watford shadow RAM board.
- Compatible with BBC B, B+, Master and Compact.
- Compatible with all filing systems: tape, DFS, ADFS, and ECONET – and many third party DFSs.

ONLY £59.95

Order Form

			£	p
☐ Instant Mini Office	£59.95	2372		
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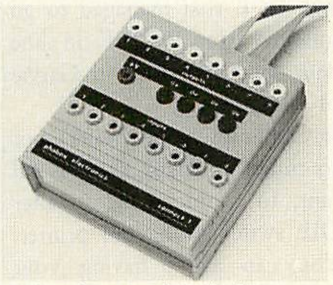
News in brief

Kosmos Software has 3.5in discs for the Compact. French, German, Spanish, Italian and Welsh language packs are £19.95 each. Contact Kosmos, 1 Pilgrims Close, Harlington, Dunstable, Bedfordshire.

Glasgow-based People's Palace is a new BBC micro-biased bullentin board, including Beeb music programs. The board runs 6.00pm to 8.00pm and accepts 300 and 1200/75 baud. Phone 041-956 6537.

Unisoft has upgraded its *Unistat* statistics package, adding a dedicated spreadsheet, the ability to handle missing observational data, extra operations and graph plotting. It costs £143.75. Unisoft has two new packages, *Lintpro* for linear/integer programming (£86.25) and *CPA*, critical path analysis software (£57.50). Unisoft, PO Box 383, London, N6 5UP.

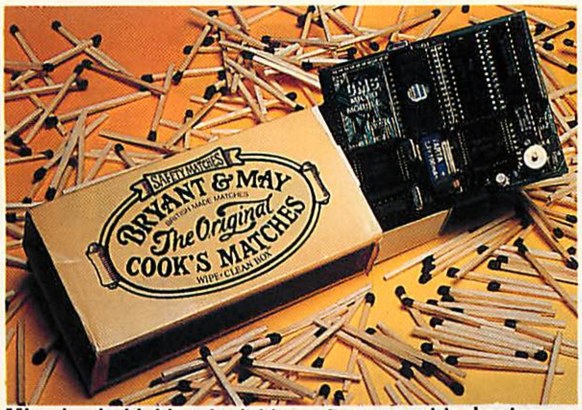
The Connect 1 interface from Phobox Electronics plugs into both the user and printer ports. It costs £35 from Phobox Electronics, Holworth House, Holworth, Dorchester, Dorset, DT2 8NJ.



Phobox for easy interfacing

British Telecom has sponsored a book aimed at 14-18 year olds, 'Finding out about Information Technology'. Copies are available for £1.40 from CRAC Publications, Hobsons Ltd, Bateman Street, Cambridge, CB2 1LZ.

The Island Logic Music System is available in a version compatible with Solidisk and Watford DFS's and with the Master and B+ 1770 DFS. Contact System, 12 Collegiate Crescent, Sheffield, S10 2BA.



Microbeeb: highly adaptable surface mount technology

Micro micro

Cambridge Microprocessor Systems has produced the real compact BBC micro: a single board computer for control applications, with most of the Beeb's facilities. Yet is measures just 3.5 x 2.5 inches.

The Microbeeb board uses a conventional components and the latest in surface mount technology to pack a 6502-compatible processor, up to 64k RAM, up to 3Mb EPROM, three serial interfaces, four analogue inputs, 35 digital outputs, stepper motor driver, clock, network interface, 40 or 80 column and Teletext video circuitry, BBC Basic and more onto the tiny board.

Customising is possible, and prices start from just £49.95.

CMS expects the Microbeeb to appeal to industrial BBC micro users. Details from Cambridge Microprocessor Systems, 20 Pence Road, Cottenham, Cambridge, CB4 4PS.

'Soul nourishing' bulletin board

The Editor's moan about the lack of women in computing has been rebuked from a Talgarth, Powis hillside.

Mrs Eluned Hurn, a busy voluntary worker and grandmother, regularly uses a micro and runs a bulletin board.

The Honeytree bulletin board is altogether different to most. It is not a 'comic strip', Eluned said, covering the usual computer hints, but more like a 'woman's magazine' with 'soul nourishing' subjects. Poetry, farming, organic food, alternative medicine, herbalism, astrology and peace are all covered.

Eluned is very much for computers. 'I can now sit in the beautiful Welsh countryside and talk with people anywhere, without running up a great phone bill' she said.

However, she agreed there are not enough women in computing and blamed the manufacturers. 'Women expect machines to work properly', she said, rather than 'tinker around and learn the technology' to get the best from their equipment.

But she has high hopes. 'When men started using kitchen equipment, it got better. Now women have started to use computers perhaps they will be better designed to cater for womens' needs'.

Readers can dial into the Honeytree board on (0874) 711147. It is an 80 column scrolling system running at 300/300 baud. Eluned is celebrating the board's second anniversary on November 29 with a meeting in the Honey Café in Talgarth. Details from the Honeytree Bullentin Board.

Sinking feeling

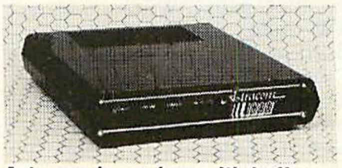
Wargamers can exercise their trigger fingers with Design People Software's *Sink The Bismark*, a one player strategy game with a hint of arcade action.

The computer controls the Bismark and six U-boats and the player runs the British fleet in a simulation which is 'historically correct in detail and concept' said DPS. *Sink the Bismark* costs £10.99 on disc only. Contact Design People Software, 77 Grimwade Street, Ipswich, Suffolk, IP4 1LN.

Feature packed modem

Astracom has launched a high tech modem for a low price, claiming its AC1000 is at £167 the cheapest V21/V23 modem available in the UK.

The AC1000 offers auto-dial and auto-answer, the latest Hayes compatible command protocol and an auto-scanning mode to set itself to the correct mode for an incoming call.



Astracom's modem with buffer

It is also equipped with a Centronics printer interface with a 6k buffer, both for direct dumping of incoming and outgoing data and for printing to a Centronics printer from the Beeb's serial port.

Communications software from Astracom supports the modem. This offers VT52, VT100, Techtronics and Prestel emulations, X-modem file transfer, printer dumps and more, for £26. Contact Astracom, 13 Beechwood Road, Uplands, Swansea, SA2 0HL.

Competition winners



Stephen Rider's Bug Runner



C Cooper's Magmalox (detail)



Wim Pontier's Kami Kaze

Let's see how you all fared in the *AU* competitions of recent months. The only result outstanding is the winner of the Great Pi competition – which is to be announced next month, along with Abuser's I Did It competition.

● Disney competition, June 1986: The favourite three cartoons are reproduced above and their artists all won a copy of Mirrorsoft's *Fleet Street Editor*, plus the new Disney character disc. They were:

Bug Runner by Stephen Rider of Gunnersbury Park, London, Magmalox by Christopher Cooper of Eltham, London and Kami Kaze by Wim Pontier from Vlaaridingen, Holland.

Twenty-five runners-up received a copy of *Strike Force Harrier* game (see below).

● July's competition was a toughie – but didn't prevent about 600 of you from trying. The answers were:

1) 210526315789473684

2) 152 4096 (the four-digit part of Mad Alex's phone number was 0504)

3) 17647059

In the three rooms all the characters were dwarves, except B in room 2. Confusion here was due to the subtle logic of propositions which carry their own truth values.

The final answer was 631, 578, 947, 424, 410, 421.

The lucky winner of the Viglen 20Mb hard disc was Vita McCourt of Alfriston, Sussex.

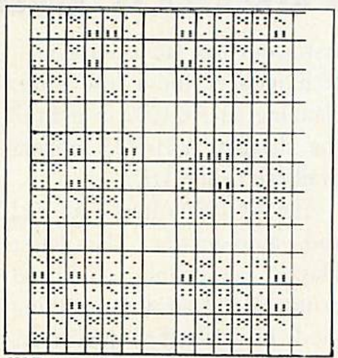
● August's competition featuring the domino puzzles attracted around 300 entries. There were several solutions, and each could be rotated. We liked the printout sent in by JN Pearce of Eastleigh, Hants (detail below). The 25 recipients of BBC Monitor ROMs are named below.

● September's competition attracted another large entry. As shown in the diagram below, each ram can be given its own enclosure with a tree by constructing only four fences. Five packs of Clares software were up for grabs. The pack consisted of two ROM chips, *BROM Plus* and *Macrom*, and two discs of *Fontwise Plus* and *Fontwise Editor*. The winners are named below.

June runners-up: Craig Harrison, Cleethorpes; Jane Davies, Weston Rhyn; R Young, Hemel Hempstead; CJ Longhurts, South Holland; EA Cook, Cwmbran; Wendy Shanks, Huntingdon; Robert Lowe, Headington; Pauline Crouch, Hastings; Peter Wilmott, Olney in Bucks; Ben Still, Bushey Heath; Carl Radley, Plymouth; Julian Nicholson, Powys; Nich Jasen, Swindon; Andrew Taylor, Barnsley; Martin Jones, Sidcup; Andrew McIntyre, East Lothian; Paul Bryant, Bristol; Clare Roberts, Wirral; K Fenwick, Newcastle-Upon-Tyne; Irfan Chaudhry, Ilford; Adam Streeting, Maidstone; Richard Griffiths, Rochdale; Lee Foster, South Sheilds; Alison Holgate, Beaconsfield and Hannah Datson, Stourport on Seven.

August winners: JN Pearce, Eastleigh; R Bates, Burntwood; PS Evans, West Glamorgan; CM Leversuch-Roberts, Tewkesbury; DB Ramsden, Grimsby; M Biddulph, Redland; CG Caine, Isle of Man; A Bryon, Nottingham; S Hancock, Milton Keynes; KJ Clarke, Poole; HJ Lockett, Preston; D Toyer, Luton; M Farrell, Nottingham; FS Dewhirst, Keighley; RS Condrey, Western-S-Mare; AW Sadd, Solihul; PJ Derlien, Sheffield; EM John, Portishead; D Couch, Dagenham; M Young, Worthing; Hans CHR Davidsen, Denmark; M Simpson, Peterborough; I Mackenzie, Edinburgh; P Smith, Melton Mowbray and K Smith, Milton Keynes.

September winners: R Westgate, Exeter; LB Benson, Marple, Cheshire; P Henley, Southampton; N Bond, Whitley Bay and G Crowder, Edinburgh.



JN Pearce's puzzle (section)

Blunderbox

Oops! The following errors crept into the recent issues of *Acorn User* – hope the hair grows back quickly:

● Profuse apologies to Rod Smith who co-authored the *Super Plotter* program with Jon Baldwin – we managed to leave his name off the article. (*AU*, November, page 91). Sorry about that Rod.

The Bird listing which is mentioned towards the top of the middle column was left out. In the meantime, it has flown from the office too and so will appear in next month's Blunderbox. Those of you who can't wait, let us have your name and address and we'll send you a copy in advance.

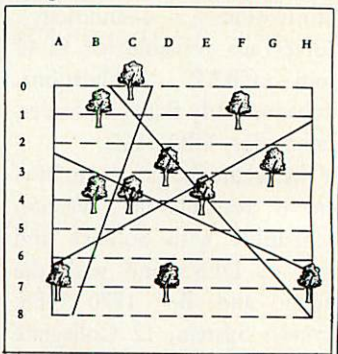
● Acorn Forum, October, page 183, the C was missing from CHR$13 in Graham Jones' scrambling Basic program. Apologies.

● In the Spider curve plotting article, October page 120, it was an E that managed to go missing from MOVE in line 880, spotted by David Garvie of Glasgow.

● Calligraphy (September): not so much an error as a useful hint, to avoid having to alter DIP switches on your printer. You can avoid having your printer churn out extra linefeeds simply by altering line 290 as follows:

```
290 VDU 1,13
```

If you are using *View* to prepare text for use with the program then save your text to disc using the WRITE command.



Solution to September's puzzle

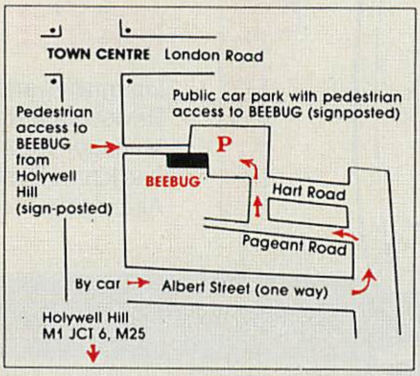
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0199G	Compact Entry System	442.75	420.61
0200G	Master 128	489.00	464.55
0202G	Master ET	368.00	349.60
0230C	65C102 6502 "Turbo"	119.00	113.05
0231D	80186 Co-Proc	395.00	375.25
0232D	32016 Co-Proc	1288.00	1223.60
0234B	M128 Econet Module	48.87	46.43
0235B	M128 Eprom Cartridge	15.18	14.42
0240C	M128 Manual 1 ADJ22	14.95	14.20
0241C	M128 Manual 2 ADJ23	14.95	14.20
0242C	M128 Adv Ref Manual	19.00	18.05
0203F	'6502' 2nd Processor	207.00	196.65
0204F	'Z80' 2nd Processor	335.80	319.01
0205F	Acorn Prestel Adapt	138.00	131.10
0206F	Acorn Teletext Adapt	148.35	140.93
0237F	Acorn IEEE Interface	322.00	305.90
0217B	1770 Disc Interface	49.39	46.92
0218A	ADFS Upgrade 1770	29.33	27.86
0209A	1.2 DNFS Rom	19.78	18.79
0207A	Basic II Rom	21.85	20.76
0208A	1.2 Operating System	6.90	6.55

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0600F	Cumana CSX100 40T	106.95	101.60
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0602F	Cumana CSX400 40/80T	142.60	135.47
0603F	Cumana CS400 40/80T	162.15	154.04
0604G	Cumana CD800S 40/80T	286.35	272.03
0614F	Cumana CS100E	118.45	112.53
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0656D	Lockable Disc Box 85	17.25	16.39

MONITORS

Code	Description	Price	Mem Price
0501H	Kaga KX1202 Monitor	116.00	110.20
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0556A	Taxan 1201/2/3 BNC	3.90	3.70
0571D	Stand for KX Series	29.00	27.55
0503G	Zenith 123 12" Green	83.00	78.85
0504G	Zenith 122 12" Amber	87.00	82.65
0530H	Microvitec 1431 Mon.	212.75	202.11
0531H	Microvitec 1451 Mon.	269.10	255.65
0550A	1.0m Mon. Lead RGB	5.75	5.46
0535H	Supervision III RGB	379.50	360.52
0536H	Supervision II RGB	318.55	302.62
0555A	Supervision Mon. Lead	7.00	6.65
0570D	Stand for Supervision	29.00	27.55
0551E	Single Master Plinth	16.10	15.30
0552E	Single Plinth	12.65	12.02
0553F	Double Plinth	23.00	21.85
0554A	Memorex VDU Cleaner	4.65	4.41

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Code	Description	Price	Mem Price
0299G	Panasonic KX-P1080	170.20	161.69
0311G	Kaga KP 810	251.85	239.26
0316G	Taxan KP910 15"	410.37	389.85
0319G	Epson FX85 NLQ	368.00	349.60
0320D	FX85 Tractor Feed	32.20	30.59
0321D	FX85 Sheet Feeder	130.00	123.50
0300G	Brother HR15XL Para	350.75	333.21
0301G	Brother HR15XL Ser.	350.75	333.21
0310G	Juki 6100 Daisywheel	362.25	344.14
0309F	Ibico LTR1 NLQ	105.16	99.90
0303G	Canon PJ1080A col.	520.00	494.00
0308G	Epson JX 80 colour	520.00	494.00
0318G	Epson HI 80 Plotter	368.00	349.60

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0400A	Platten Cleaner Kit	6.44	6.12
0401A	2M Printer Lead	8.00	7.60
0402A	Epson FX/RX80 Ribbon	4.00	3.80
0403A	Epson FX/RX100 Ribbon	5.00	4.75
0408A	Canon/Taxan Ribbon	5.63	5.35
0409A	Black Cart PJ1080A	7.19	6.83
0410A	Colour Cart PJ1080A	9.99	9.49
0413A	LX 80 Ribbon	4.60	4.37
0414A	Ibico Ink Roller	4.60	4.37
0415A	Epson JX80 Ribbon	16.22	15.40
0418A	Juki 6100 S/S Ribbon	1.55	1.47
0406D	11" *9.5" Paper 2000	14.03	13.33
0453G	2-part NCR Paper	23.00	21.85
0407C	3.5" *1 7/16" Labels	5.63	5.35
0416A	Dust Cover KP810	5.45	5.18

AMX MOUSE

Code	Description	Price	Mem Price
0703B	AMX Mouse	74.75	71.01
1150B	AMX Desk Disc	19.00	18.05
1151B	AMX 3D Zicon Disc	19.00	18.05
1152B	AMX Database Disc	19.00	18.05
1153B	AMX XAM	19.00	18.05
1154C	AMX Pagemaker Plus	40.00	38.00
1155B	AMX Superart Rom	40.00	38.00
1156B	AMX Paint Pot Disc	10.99	10.44
1157C	AMX Mind Games Disc	14.50	13.78
1158A	AMX Zap Zone Cass	4.90	4.65
1160B	AMX Utilities	10.99	10.44

WATFORD HARDWARE

Code	Description	Price	Mem Price
0213A	Watford DFS Rom+Man	27.48	26.11
0214B	Watford DDFS Kit	56.35	53.53
0216A	Watford DFS Manual	6.95	6.60
0219B	Watford 1.43 DFS Kit	62.10	59.00
0702A	Watford 32K RAM Card	67.28	63.91
0709D	Watford Eprom Eraser	33.35	31.68
0717A	Watford Sideways ZIF	17.83	16.93
0736A	Watford 12 Rom Board	36.80	34.96
0737A	Watford Battery	4.37	4.15
0750B	Watford S/State 16K	32.20	30.59
0751B	Watford 16K Module	30.59	21.85
0752B	Watford Diagnostic	23.00	21.85
0753B	Rom/Ram Board 64K	67.85	64.46
0754B	Rom/Ram Board 128K	102.35	97.23
0755A	Write Protect Mk12	2.76	2.62
1120B	Watford TD Rom (SD)	28.75	27.31
1121B	Watford TD Rom (DD)	28.75	27.31

OTHER HARDWARE

Code	Description	Price	Mem Price
0701A	Aries B32 RAM Card	93.15	88.49
0704A	ATPL ROM Board BBC	39.67	37.69.
0735A	ATPL Battery Backup	17.37	16.50
0740B	Aries B12 Rom Board	46.00	43.70
0749A	Aries B12C Adaptor	5.87	5.57
0705A	2764 8K Eprom	2.64	2.51
0706A	27128 16K Eprom	3.33	3.17
0707A	6264 8K Ram	3.68	3.50
0708A	Eprom Extractor Tool	3.45	3.28
0710B	Spotlife Rom Blower	75.90	72.11
0713A	Phone 2 in 1 Adaptor	6.30	5.99
0714A	BBkey Lables	2.09	1.99
0715A	Dust Cover BBC B/B+	3.45	3.28
0734A	Dust Cover Master	4.60	4.37
0716F	Music 500	86.32	82.00
0718B	Voltmace 3B Single	9.99	9.49
0719B	Voltmace 3B Twin	17.00	16.15
0720B	Voltmace Delta 14B	12.50	11.88
0721B	Voltmace Delta 14B/1	13.00	12.35
0762E	Beebug Magic Modem	95.00	90.25
0763E	Beebug Modem+ S'ware	109.00	103.55
0810D	BBC Keyboard	52.90	50.26
0811A	Video ULA Chip	17.25	16.39
0812A	A to D D7002C Chip	5.29	5.03
0814A	Keyboard Connector	5.75	5.46
0815A	65C02 CPU	13.80	13.11

ACORNSOFT

Code	Description	Price	Mem Price
1000B	Acornsoft View	44.28	42.06
1022C	View 3.0 Rom	66.70	63.36
1002B	Acornsoft Hi-View	44.28	42.06
1013B	View Print/Drive T.	8.62	8.19
1014B	View Print/Drive Disc	9.77	9.29
1043B	Acorn Viewspell Rom	34.02	32.32
1021A	Acorn Viewindex Disc	14.37	13.66
1019B	Acorns Viewstore Rom	44.28	42.06
1030B	Acornsoft ViewPlot	25.30	24.03
1001B	Acornsoft View Sheet	44.28	42.06
0243A	Master Lisp C.ROM	59.69	56.70
1003A	Acornsoft Lisp Rom	41.40	39.33
1025B	Acornsoft Lisp Cass	10.35	9.83
1041B	Acornsoft Forth Rom	38.53	36.60
1042B	Acornsoft Forth Disc	19.00	18.05
1027C	Micro PROLOG	74.75	71.01
1033B	Microtext Disc	55.20	52.44
1034C	Microtext Plus Rom	240.00	228.00
1035B	6502 Dev. Pack	45.00	42.75
1004B	Acornsoft BCPL	50.03	47.52
1026B	BCPL Generator	43.57	41.39
1005B	Acornsoft Comal	41.97	39.88
1006B	Acornsoft Logo	50.71	48.18
0244A	Master PASCAL C.ROM	67.85	64.46
1007C	Acornsoft ISO Pascal	50.71	48.18
1028B	Pascal Generator	32.78	31.14
1031B	Acorn Termulator Rom	31.05	29.50
1008B	Acornsoft Basic Ed	28.00	26.60
1040C	Micros Business Disc	47.27	44.90
1037B	Database Cassette	11.50	10.93
1038B	Database Disc	14.50	13.78
1017B	Acornsoft GXR B	25.43	24.16
1018B	Acornsoft GXR B+	25.43	24.16
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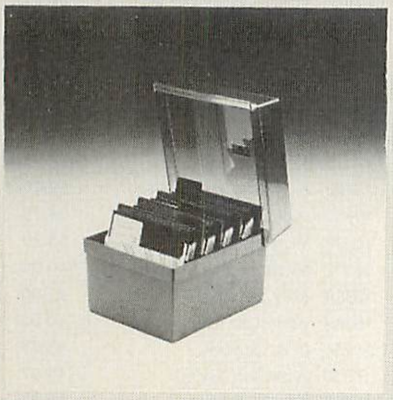
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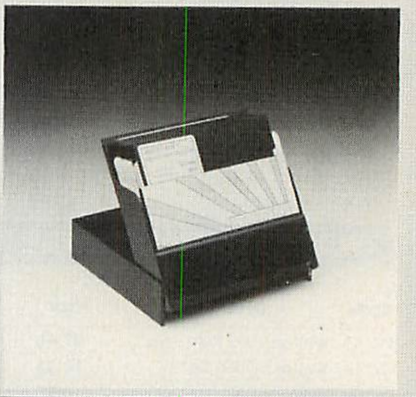


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50	S/S	£50.00	£47.50	50	D/S	£53.00	£50.35

1015B	Acornsoft Revs Disc	17.08	16.22
1029A	Revs 4 Tracks Disc	11.95	11.35
1024B	Acornsoft Revs Cass	14.00	13.30
1032B	Revs 4 Tracks Tape	9.32	8.85
1016B	Acorn Aviator Disc	17.08	16.22
1044B	Acorn Aviator Cass	14.00	13.30

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1103B	C.C. Graphics ROM	24.73	23.49
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1105B	Printmaster (Star)	28.00	26.60
1106B	Accelerator	56.01	53.20
1107B	Speech ROM	28.00	26.60
1109B	Disc Doctor	27.00	25.65
1110B	Intersheet	44.85	42.61
1111A	Hi Intersheet Disc	5.75	5.46
1112A	Hi Wordwise+ Disc	5.75	5.46
1113B	Caretaker Rom	28.75	27.31
1114B	Interchart	29.90	28.41
1115B	Speech System TTS	30.99	29.44
1116B	Interbase	67.85	64.46
1117B	Interword	50.03	47.52

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1124A	Citadel 40/80	11.95	11.35
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1126B	White Knight Cass	9.89	9.40
1127A	White Knight 1770	18.63	17.70
1128B	Movie Maker	20.95	19.91
1129A	THRUST	11.95	11.35
1130A	REPTON2	11.95	11.35
1170D	Fleet Street 40T	37.95	36.05
1171D	Fleet Street 80T	37.95	36.05
1172A	Mini Office II Cass	14.50	13.78
1173A	Mini Office II 40T	16.50	15.68
1174A	Mini Office II 80T	16.50	15.68
1175A	Clares Replica II	15.00	14.25
1011B	BBCsoft UltraCalc 2	70.00	66.50

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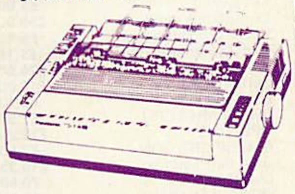
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KX-P 1080 DOT MATRIX PRINTER

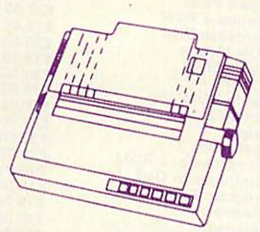
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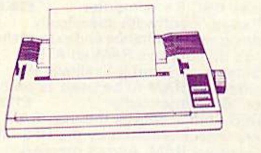
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EPSON LX86

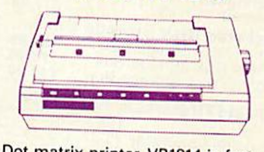
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☆11 Language international character font is internalized
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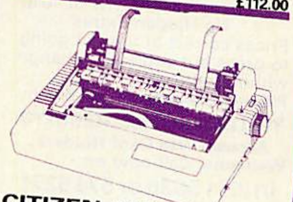
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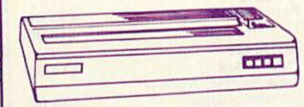


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EPSON LQ800

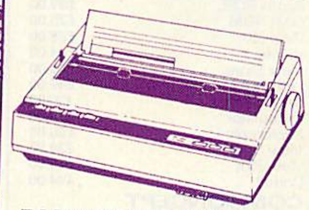
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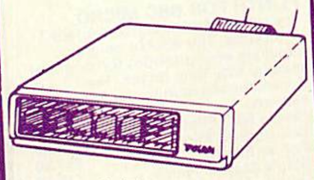
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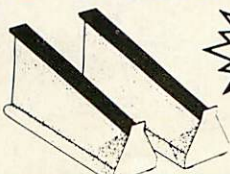
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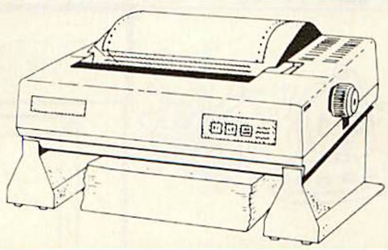
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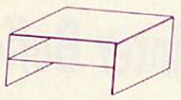
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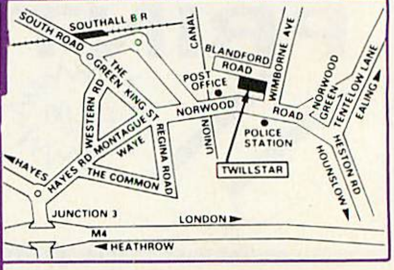


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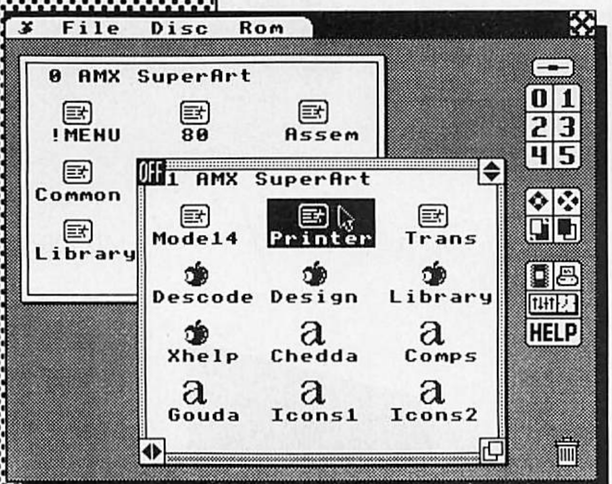
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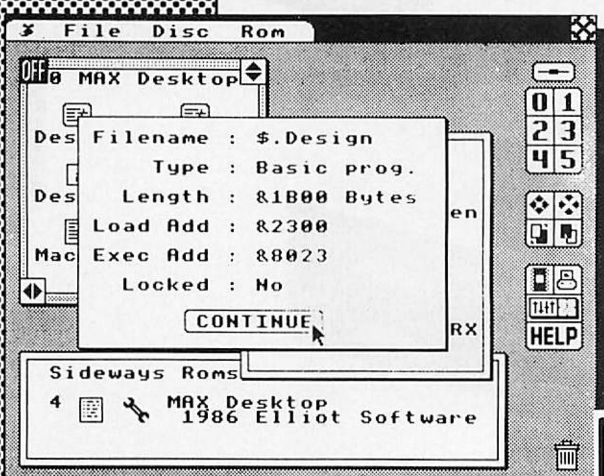


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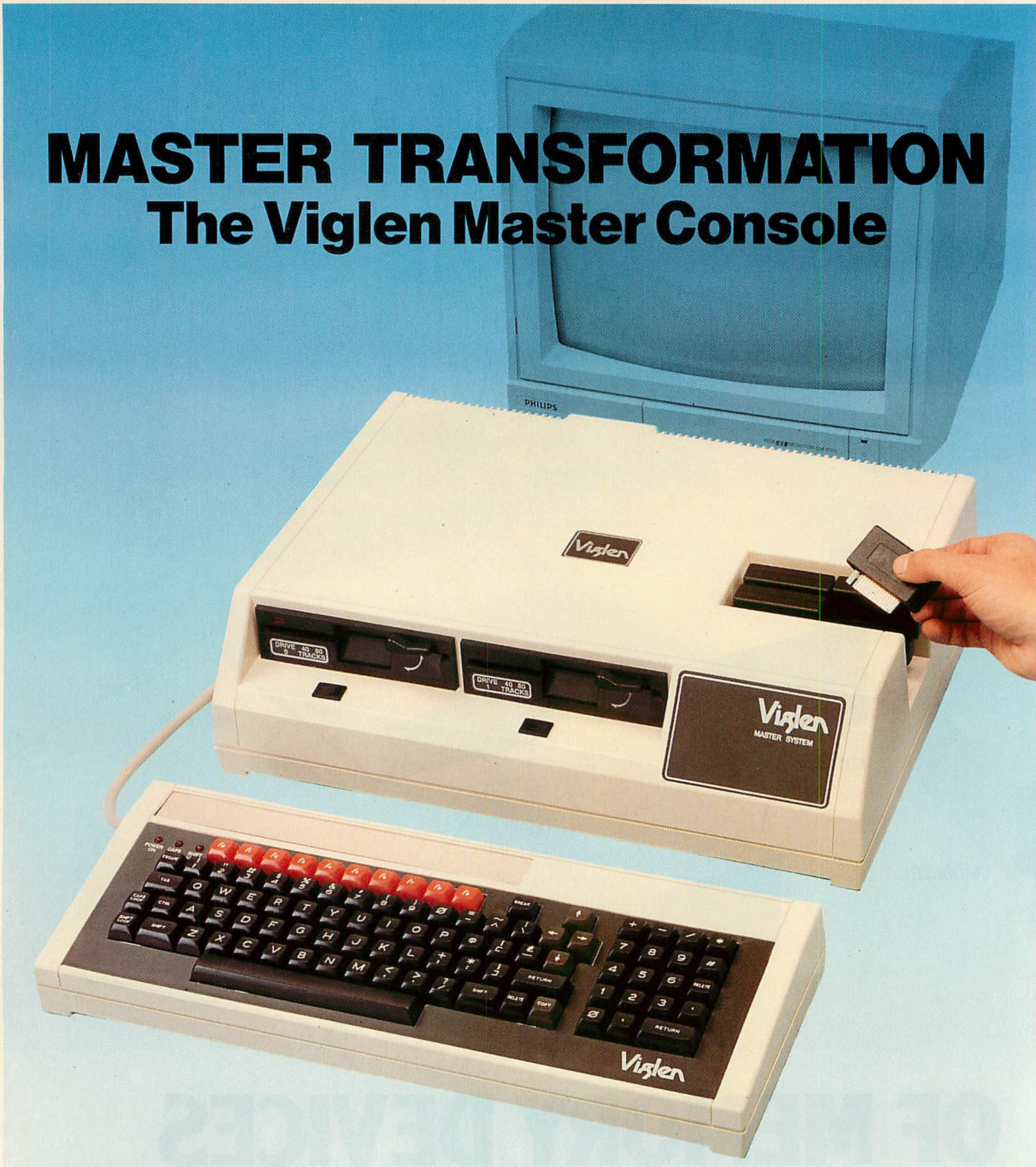
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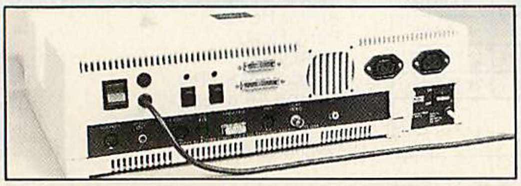
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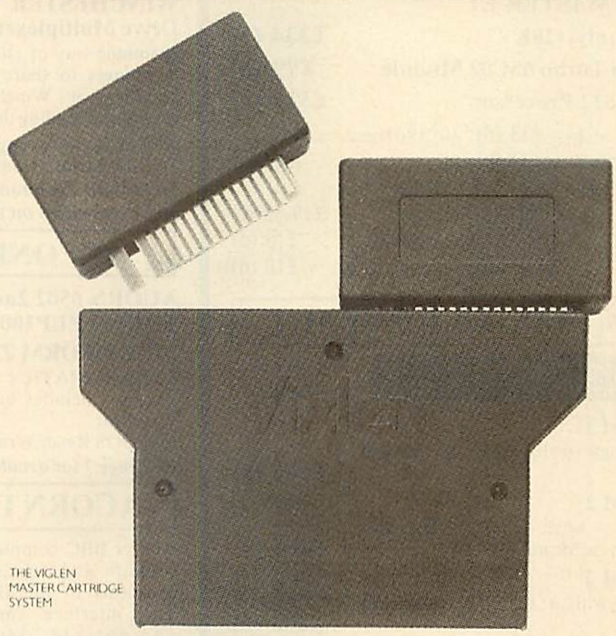
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Details on Technomatic Winchesters and accessories on page 6

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See specification on page 5.

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Full details on page 6.

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Full specification on page 6.

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UTILITIES

ACCELERATOR	£49 (d)
ACORN BASIC EDITOR	£22 (d)
MONITOR (BBC Pub)	£34 (a)
BROM PLUS	£26.50 (d
SLEUTH	£23 (d)
TOOLKIT PLUS	£31 (d)
TOOLBOX 2 (BBC Pub) Manual	£9.50 (d)
Cassette	£9 (d)
EXMON II	£23 (d)
HELP II	£25 (d)
ACORN GXR GRAPHICS ROM specify B or B+	£22 (d)
PRINTMASTER	£24 (d)
DUMPMASTER supports about 40 printers	£26 (d)
FONTWISE PLUS	£17 (d)
HERSHEY FONT CHARACTER GENERATOR	£18 (d)
ICON MASTER	£29 (d)
BILLBOARD	£18 (d)
STUDIO EIGHT	£19 (d)
MOVIE MAKER Two Roms + Cassette	£26 (d)
CC SPEECH ROM	£28 (d)
CC SPEECH ROM to Text Rom	£34 (d)
ACORN SPEECH ROM	£15 (d)
ADV TELETEXT UTILITIES ROM	£7.95 (d)

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Orders welcome from government depts & educational establishments.

All prices ex VAT.
Prices are subject to change without notice.

Please add carriage
(a) £8.00 (Datapost)
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(d) £1.00

BBC PUBLICATIONS EDUCATIONAL SOFTWARE

A series of programs developed in many cases alongside Radio & TV programmes by BBC's Education Department which supplement the classroom studies by moving and colourful displays helping in clear understanding of a variety of subjects. Some packages also include audio cassettes.

PRIMARY EDUCATION

ASTRONOMY:
9-12 years. Phases of moon, eclipses, seasons etc. Includes a game. **Disc £11 (d)**

COMPUTERS AT WORK:
The Work Game illustrates two of the most important computer applications: Robotics & IT. Incl. a database prog, word processing tutorial and a robotic control prog. **Aud/EC/disc £16 (c)**

PICTURE CRAFT
An inexhaustible, versatile and flexible suite of programs to design shapes & patterns, paint them and convert them into pictures, puzzles and games. **Disc £17 (d)**

DRAWSTICK
8 year upwards for creating pictures, charts, maps etc. Pictures created can be used in your own programs. *Sufficiently sophisticated* for use by adults. **Cass £8 (d)**

INTRODUCING GEOGRAPHY
9-13 years. Four exciting graphical adventures include river navigation, flying, mountain climbing and desert crossing. **Disc £16 (d)**

MATHS WITH A STORY 1
Four primary level programs incl symmetry, co-ordinates and probability for children of wide ranging abilities. **Cass £8 (d)**

MATHS WITH A STORY 2
Similar programs as 1 but covered from a different angle. **Cass £8 (d)**

NUMBER GAMES:
6 programs designed to stimulate the mind of an active child of 8 years and upward. **Cass/EC £7.50(d)**

USING YOUR COMPUTER
8/12 years. Introduction to computers using synchronised audio techniques. Total of 80mins of audio & 14 progs. **Cass £24 (c)**

WORD PLAY
An elegant but simple introduction to word processing using animal shapes for editing functions. Fun manual for the children. **Cass £10 (d)**

WORD MOVER
A simple text editor. **Cass £8 (d)**

SECONDARY LEARNING

ADVANCED LEVEL STUDIES: STATISTICS
6 progs covering central concepts and principles. Topics include Discrete Data & Binomial Distribution. Eont. Data & Normal Data Distribution. Hypothesis Testing & Confidence intervals, Central Limit theorem & Estimation, Simulations, Correlations and Regressions. **Disc £23 (d)**

ADVANCED STUDIES: GEOGRAPHY
4 progs covering social geography: Traffic & Town planning, drainage & basin management and planning for industry. **Cass £10 (d)**

INSIDE INFORMATION
Designed to introduce IT to young adults. Suitable for use in sec. schools, ITeCs & Adult Educ. Centres. **Prog Cass £10 (d) Audio Cass £5 (d) Book £8 (d)**

OPEN LOGO
Open University Logo incl two 16K roms and two manuals. **£55 (c)**

SCIENCE TOPICS (ST)

S.T.: WAVES
A Physics program allows display of waveforms and shows changes caused by different parameters. **Disc £14 (d)**

S.T.: RELATIONSHIPS
A Biology program giving a sophisticated simulation exercise based on data from W.H.O. **Disc £14 (d)**

S.T.: BONDING
A Chemistry program to reinforce & strengthen the concept of bonding of elements. Transfer and sharing of electrons are both shown graphically. **Disc £14 (d)**

S.T.: ELECTROMAGNETIC SPECTRUM
A graphical adventure prog to test your knowledge of the electromagnetic spectrum. **Disc £14 (d)**

S.T.: ELECTRONICS IN ACTION
Program about using computers for control. Control is achieved by using 6502 assy lang. Prog editor is supplied. **Disc £14 (d)**

S.T.: NEWTON & THE SHUTTLE
A interactive prog in 3 parts covering launch to recapture of a satellite to test the knowledge of Newtonian mech. **Disc £19 (d)**

S.T.: ECOLOGY
Simulation program managing a nature reserve to meet a host of individual needs. **Disc/EC £19 (d)**

S.T.: POLYMERS
Students run a manufacturing co. and have to choose best materials for their products and compete with a rival co. run by the computer. **Disc/EC £19 (d)**

S.T.: CLASSIFICATION & PERIODIC TABLE
A database program for producing different classifications of chemical information and presented in any format. **Disc £20 (d)**

S.T.: FOOD & POPULATION
Simulation in space of biological aspects of nutrition and food production logistics. **Disc £20 (d)**

SEC. SCIENCE: MICROTECHNOLOGY
Fundamental concepts of electronics Logic & Resistor Tutors, Servo Cct simulation & a cct design program. **Cass £7 (d)**

SEC. SCIENCE: THE MOLE CONCEPT
A computer sync. audio program explains definitions of atomic & molecular masses and depicts molar equations. **Disc/Aud/EC £16 (c)**

SEC. SC.: UNIFORMLY ACCELERATED MOTION:
Illustrates basic eqns., uniform accln, under gravity and an idea of terminal velocity. **Disc/AUD/EC £16 (d)**

VU-TYPE
The popular 'Sight & Sound' touch typing tutor with alterable settings. **Disc/EC £15 (d)**

GENERAL

GAME CORE
Provides information and intelligence routines for writing board games. **Cass £9 (d)**

VU TYPE PROFESSIONAL
An enhanced and expanded version of Vu Type with 63 Pitman approved exercise. **Disc £19 (d)**

WHITE KNIGHT MK II
(Specify if for Master). **Disc £16 (d)**

BATTLEFIELDS **Cass £8.50 (d)**

DEUTSCH DIREKT
Disc based vocabulary learning prog with audio cassette to help with pronounciation. **Disc/aud/EC £16 (c) Book £5.95 (d)**

A VOUS LA FRANCE
A home study aid for anyone learning French. **Cass/EC £12 (d) Book £5.25 (d)**

Cassette based programs listed above can be supplied on disc at an extra charge of £1.50 per disc and please specify the format required 40 or 80T.

PRINTER ACCESSORIES

EPSON ACCESSORIES:

Interfaces:
8143 RS232........£28 (d)
8148 + RS232 + 8K........£75 (d)
8165 IEEE + Cable........£65 (d)
8148 RS232 + 2K........£57 (d)
8132 Apple II........£60 (d)
8177P NLQ for FX80 + /FX100 +........£99 (d)
Parallel & Serial Buffers of various size also available.
FX80/80 + /85 Tractor Attachment........£37 (c)
FX80/80 + Paper Roll Holder........£17 (c)
LX80 Tractor Feed........£20 (d)
LQ800 Tractor Feed........£44 (b)
LQ1000 Tractor Feed........£49 (b)

SHEET FEEDERS:
8338 LX80........£49 (b)
8333 FX100 + /105........£169 (a)
8331 FX80 + /85........£129 (b)
8330 RX80 +........£129 (b)
LQ800........£129 (b)
LQ1000........£159 (b)

Ribbons:
RX/FX100/100 + . FX105........£10 (d)
RX/FX80/80 + , FX85........£5 (d)
LX80........£4.50 (d)
LQ800........£8.50 (d)
LQ1000........£10 (d)
H180 Pen Set (Aqueous/Ball point)........£7.50 (d)

Dust Covers:
FX80........£5.50 (d)
TAXAN/Canon KP810........£6 (d)
FX100........£7.50 (d) KP910 £7 (d)

HITACHI 672 Plotter
Aqueous Pen Set six pens........£18.50 (d)
Oil Based Pen Set six pens........£25.00 (d)

TAXAN CANON Accessories:
RS232 + 2K buffer........£78 (d)
Ribbon........£6 (d)

JUKI 6100
RS232 Interfaces........£65 (d)
Tractor Feed........£129 (a)
Ribbon (Carbon)........£2.00 (d)
Spare Daisy Wheel........£14 (d)
Sheet Feeder........£182 (a)

BROTHER HR15
Daisy Wheel........£18 (d)
Tractor Feed........£90 (a)
Ribbon (Carbon/Nylon)........£3.00 (d)
Sheet Feeder........£182 (d)
Keyboard........£135 (a)

Printer Leads:
BBC Parallel Lead (1.2m)........£10 (d)
BBC Serial Lead (1.2m)........£6 (d)

Other lengths can be supplied on order:
IBM Parallel Lead (2m)........£12 (d)

PAPER & LABELS
Plain Fanfold paper with micro perforations:
2000 sheets 9½" × 11"........£13 (b)
2000 sheets 14½" × 11"........£18.50 (£4.50)

Labels/1000:
Single Row 3½ × 1 7/16"........£5.25 (d)
Triple Row 27/16" × 17/16"........£5 (d)

BBC SPARE PARTS

All Prices are Retail ex-VAT carriage code (d).

BBC & Misc:		74ALS 245	£5	74LS10	£0.24
Keyboards	£52 (b)	88LS120	£3.00	74LS123	£0.80
Powers Supply	£52 (b)	**BBC PLUS:**		74LS163	£0.75
Keyswitch	£1.75	PAL16REN	£13.50	74LS244	£0.80
Video ULA	£18	64K × 4 DRAM	£8.50	74LS245	£1.10
Serial ULA	£14	6512A	£12.50	74LS373	£0.90
DNFS	£18	SAA5050	£9.00	74LS393	£1.00
UHF MOD	£4.50	6845SP	£6.50		
6502A CPU	£6.50	UPD7002	£5.00	**BBC MASTER:**	
65CO2 CPU	£12	DS3691	£3.50	1-Mbit ROM	£39
6522 VIA	£3.50	7438	£0.40	MSI CHROMA	
6522A VIA	£5.50	74LSOO	£0.24	IC	£13.50
LM324	£0.45	74LSO4	£0.24	65SC12P-2	£12.50

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ACW443 CAMBRIDGE WORKSTATION

A complete self-contained workstation with:.

* NS32016 8MHz Main Processor & 32081 FP processor.
* 20 Mbyte Winchester and one 80T Ds floppy drive.
* A detachable keyboard Hi Res RGB Monitor.
* 4Mbyte of on board Ram as standard.
* Languages supplied include: Fortran 77, Pascal, C, Cambridge LISP, 32016 Assembler & 32bit BASIC.
* Utilities on the operating system to cross link programs between different languages, utilities for porting programs to mainframes.
* **Phone for detailed leaflet.**

32016 CO-PROCESSOR

A second processor that brings genuine 'Mainframe' power to the BBC Computer.

* Interfaces with the BBC through the tube connector.
* NS32016 6MHz CPU & 32081 FP processor.
* 1Mbyte Ram as standard.
* Packaged software includes all the languages and utilities supplied with the ACW Work Station.
* **Phone for detailed leaflet.**

CPU/FP Upgrade Kit (non-Acorn) for the Co Processor for 8Mhz operation to enable use of ADFS with the floppy drives is available. It can be fitted at no extra charge if ordered with the Co Processor.

A list of software available for the 32 bit processors is available on request.

512 CO-PROCESSOR

Brings professional software to the BBC Master.

* 10 Mhz 80186 *DOS PLUS.
* GEM Write & GEM Draw.
* 'WIMP' Environment with high quality Mouse.
* Runs many 'IBM' programs — even 'Flight Simulator'!
* Convert to/from IBM/BBC data.

DOTPRINT PLUS

A uniquely versatile NLQ ROM for the BBC Micro.

* Built-in character font generator.
* Built-in view printer driver.
* Supports microspacing for professional justification in View & with disc in Wordwise/Plus.
* True bold print as well as double width.
* 12 character pitch as standard.
* Fully variable pitch and line spacing.
* Suitable for fully **'EPSON'** compatible printers with quad-density graphics.
* **DOTPRINT PLUS** for EPSON FX/RX and compatibles.
* **DOTPRINT DUAL** for EPSON MX range.

MICROJUSTIFIED TEXT

homes of a ruling class whose right to
rule was based on the ownership of
land. Large estates produced money;
perhaps even more important, they
supplied people to fight for their

NORMALLY JUSTIFIED TEXT

homes of a ruling class whose right to
rule was based on the ownership of
land. Large estates produced money;
perhaps even more important, they
supplied people to fight for their

Notice how MICROJUSTIFICATION eliminates 'stretched' spaces between words.



For price details see page 1.

Compact
BRITISH BROADCASTING CORPORATION
MASTER SERIES MICROCOMPUTER

THE FAMILY COMPUTER

Now available from stock

This low cost high tech computer has developed specially as a computer for home use.

SPECIFICATION

128K RAM, ADFS Filing system, BBC Basic version 4, MASTER style keyboard, a single 640K 3.5" double sided drive. RGB/Mono Monitor as an optional extra.

Bundled software pack includes:
Desk Top Prog with note pad & calculator, VIEW 3.0, Card Index, & LOGOTRON. A set of exciting games and graphic demos.

IMPORTANT NOTICE

We would like to advise all our customers who purchased the BBC Master Computer from us between January to June 1986 to ensure that the ram batteries are replaced. The replacement kits are available free of charge.

EPSON LQ800/1000

Uses top quality 24 pin dot-matrix technology.

* Superb 'letter quality' at 67cps.
* Fast clear draft quality at 200cps.
* LQ/Draft modes selectable from front panel.
* Variety of fonts, usable in both draft & LQmodes.
* Optional 'personality' modules for Diablo and IBM emulation.
* Optional Font modules.
* Friction feed.
* Hi Res bit image graphics with hex density.
* 7K buffer, both serial and parallel interfaces as standard.

EPSON HI-80

* A4 with 4 colour precision plotting.
* Low cost while maintaining precision.
* Variety of pens available.
* Ideal for overhead transparencies.
* Powerful software commands allow complex plots.
* Superb line/bar/pie charts simply produced.

EPSON EX800

A new addition to the EPSON range provides faster printing speeds to offer versatility in volume printing. This 80 column printer prints at 300 cps in 12 cpi mode, 250 cps in 10 cpi and 50 cps in letter quality mode. Four built in fonts, including two letter quality fonts can be printed in a variety of typestyles. Full graphics facilities are included. Most selection from the front panel. Parallel and serial interfaces and tractor and friction feeds are standard. Four colour printing option available.

NAT. PANASONIC KX P1080

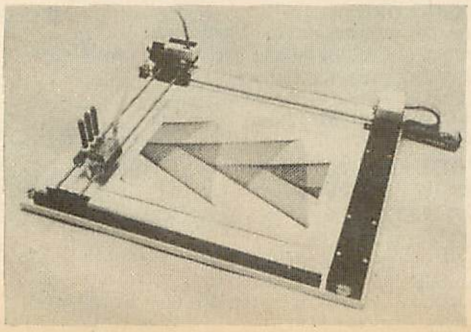
A high performance low cost printer with full character pitch feature 10, 12, 15 & 17 cpi and proportional spacing in both draft and NLQ mode. 80 column, 100 cps draft and 20 cps in NLQ. Parallel interface and Friction and Tractor feeds as standard. Epson Compatible Graphics.

HITACHI 672

* A3 four colour precision plotter.
* Serial and parallel ports as standard.
* Produces 'OHP' transparencies as well as plain paper.
* 'HP' graphics language or single character commands.

GRAPHICS WORKSTATION

A A3 pen plotter with 0.1mm resolution allows graphs, charts, architectural drawings to be plotted using the 9 predefined plotting instructions or by using a CAD package. The pen mount allows a variety of pen types including drawing pens to be used or the following range of accessories to be fitted.



OPTICAL SENSOR

This converts the plotter into a input device and offers a new range of applications: Scan or digitise a picture or a drawing to display or store. Traverse mazes and investigate methods of artificial intelligence. Reliably read bar codes.

DRILL/ROUTER

This will drill holes, machine moulds and cut complex 3-D shapes in a range of suitable materials to a depth of 16mm. Driver software is supplied on disc and an optional application program is available to interface the drill/router to our NOVACAD package.

SCRIBER

The sharp pointed scriber may be used to etch fine line drawings on surfaces such as scraperboard, wax coated copper etc. Full details on request. See page 1 for price.

All accessories available separately if required.

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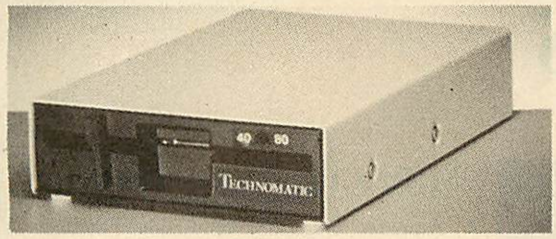
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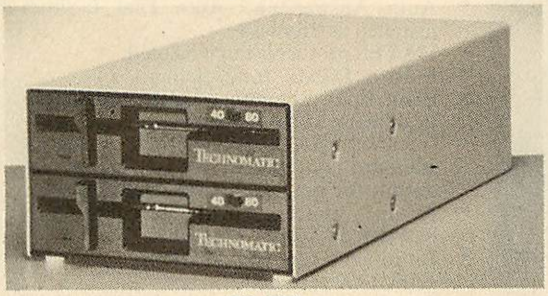
Orders welcome from government depts & educational establishments.

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Prices are subject to change without notice.

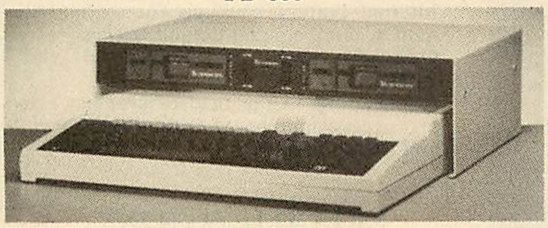
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(b) £2.50
(c) £1.50
(d) £1.00

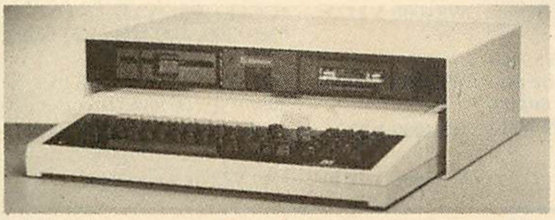


TS 400



PD 800


PD 800 P


P2041 HT

DISC DRIVES

TECHNOMATIC offers a wide range of high quality, high performance drives to meet all needs of BBC micro users. Please see our detailed and competitive price list on page 2.

*All drives are fitted with high quality slim line ultra low power mechanisms capable of single and double density operation and offering very fast track access and head settling times.

*5.25″ floppy drives are fitted with 40/80 track switches as standard at no extra cost. The switches are located in the front and clearly marked to indicate the status at a glance.

*The mechanisms are set inside attractively styled, sturdy metal casings painted in BBC beige colour.

*The plinth version drives provide for a neat and compact system installation giving it a more professional look.

*All drives fitted with all necessary leads and are ready for operation on unpacking. The drives with the mains power supply are supplied with a mains lead fitted with suitably fused 13A moulded plug.

WINCHESTER DRIVES

Mass storage 20 Mbyte drives are available in the following versions:

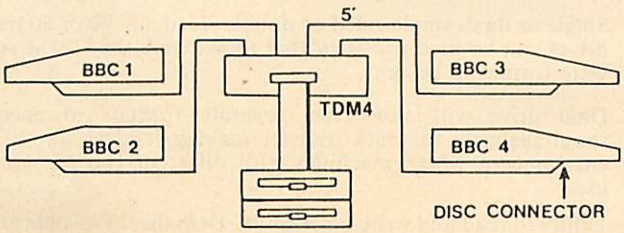
* P20HD Stand alone.
* P204HP With a single floppy housed in a plinth version case.
* P214TS Top of the range with a 10 Mbyte back up streamer and a single floppy housed in a plinth type casing and supplied with backup utilities.
* TS10 A stand alone 10Mbyte streamer for those who are already equipped with a Winchester and a floppy drive. Utilities for backup can only be loaded from a floppy.

All models are fully compatible with Acorn's ADFS system and include a mains psu and the necessary cable connections.

ALL TECHNOMATIC DRIVES NOW CARRY A TWO YEAR WARRANTY

DISC DRIVE MULTIPLEXER

The cost-effective alternative to networking! A self-contained unit that enables up to four computers to be connected to one single or dual disc drive. No hardware modifications — simply plugs into the computers disc interface connectors. No ROMs or other software needed. All DFS commands work as normal. The switching of drives between computers is totally automatic and completely invisible to the user. This unit is ideal for installing in classrooms and other situations, where networking is not planned or necessary, or where costs must be kept low. In many cases software needs to be shared, although full networking complexity and cost is not needed. Several of these units can be connected in series to allow more computers to access the same discs, i.e. two quads connected together will allow 7 computers to share 1 drive. Units are supplied with 5′ of cable per outlet as standard. Mains powered.



TDM4 Quad Unit (up to 4 computers)
TDM2 Dual Unit (2 computers)

WINCHESTER DRIVE MULTIPLEXER

A unique addition to our hardware range that allows the sharing of a Winchester between a number of computers. The principle of operation is the same as our highly popular disc drive multiplexers and there is no need for any additional software or hardware modifications. The Multiplexers are available in two versions, a dual unit for two computers and a quad unit for four computers to share a Winchester. Multiplexers are particularly useful for accessing common software and transferring data between the computers. (Not recommended for use with randon access files).

3M FLOPPY DISCS

FREE Clock/calculator with every 5 boxes of 3M discs purchased.



Every single 3M Floppy Disc carries a written lifetime guarantee that it will perform reliably. Not only do 3M offer a highest quality product but also a very competitive price. Please see page 2 for details. 3M Floppy Discs are supplied in sturdy storage boxes each containing 10 discs.
While offer lasts discs will be supplied at specially reduced prices.

FLOPPICLENE Disc Drive Cleaning Kit

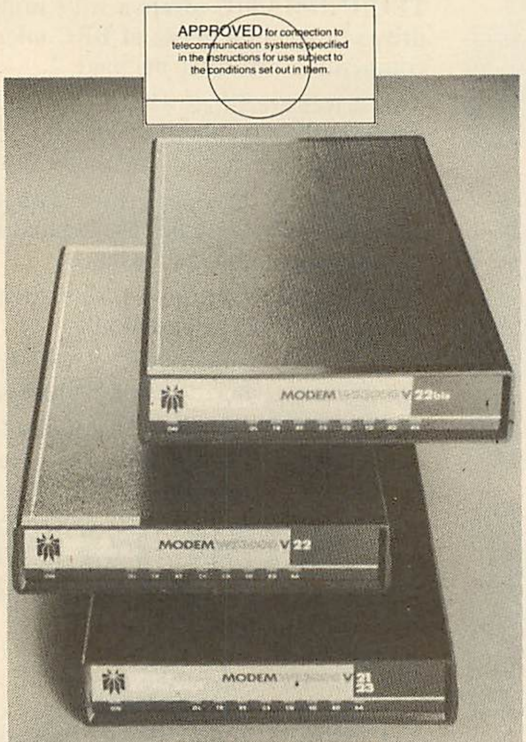
Floppiclene introduces a positive concept in ensuring continuous high performance of the disc drives by providing an easy and efficient method of keeping the drive heads clean. Use of disposable cleaning discs eliminates the risk always present in reuseable discs of recontamination and abrasion of the sensitive drive heads. Available for both 5.25″ and 3.5″ drives. Please see page 2 for prices.

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MODEMS



WS 3000 Range

MIRACLE WS4000

* A cost effective intelligent modem that offers the best value for money bringing the world of data communication within easy reach.
* Plain English commands make it simple to use, even for the first time user.
* Latest Hayes-type protocol commands, auto dial, auto answer, auto speed seeking.
* Equalisation model in V23 for line-noise filtering.
* Many other options including upgrading to V22 and V22 bis.

MIRACLE WS2000

* A comprehensive manually switched 'World Standard' modem.
* Competitively price with a capability to be upgraded for various options.
* BT approved for V21/V23, 300/300, 1200/75 and 1200/1200 half duplex.
* Includes BEL103/113/108 standards for use outside UK.

Optional extras include (Not BT approved).
* SK1 chip set for computer control.
* User port cable.
* Auto dial Board.
* Auto Answer Board.
* DS1 disc for auto dial facilities on Commstar.

Miracle have introduced two new models in the WS3000 series for users who require a modem for a specific use. Model WS3022 provides 1200/1200 baud full duplex operation whilst only WS3024 provides 2400/2400 baud fd only.

Please see page 2 for prices

MIRACLE WS3000 RANGE

* A professional range of intelligent modems with full BABT approval.
* Auto Answer and Auto Dial facilities installed as standard.
* HAYES protocols implemented.
* Pulse or DTMF 'tone' dialing.
* Plain English command structure simplifies the use of the modem.
* Integral parallel printer port fitted as standard configurable for both input and output for process control applications.
* A line sharing facility to differential between data and voice calls.
* Intelligent speed buffering converts 1200/1200 terminals to 1200/75
* Equalisation mode for line noise filtering.
* Internal battery back up for storing 63 names, numbers and default settings.
* Upgrade path for 1200/1200 and 2400/2400 and security encryption.
* Applications in the field of graphics and text access, high speed telex, user to user, and user to main frame.

SPECIFICATIONS

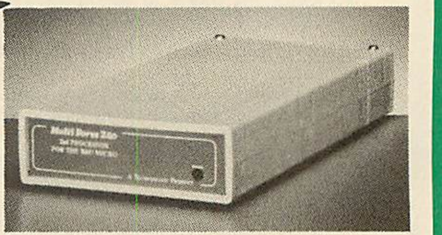
WS4000 V2123:	*CCITT V21/V23. *300/300, 600 and 1200 half duplex, 1200/75.
WS3000 V2123:	*CCITT V21/V23/Bell 103. 300/300, 600 and 1200/75
WS3000 V22:	*As V2123 and also 1200/1200 full duplex.
WS3000 V22 bis:	*As V22 and also 2400/2400.

MULTIFORM Z80

includes a FREE Pocket Wordstar package

A unique Z80 2nd Processor with a 'MULTI FORMAT' capability.

"A wide selection of programs were installed and tested without problems. The task of transfering and installing the programs for the system was greatly eased by the flexibility of the multiformat approach and the implementation of the terminal emulators. *Ed Brown Acorn User Oct 86.*"



Please see page 1 for prices

* It is capable of running most CP/M 2.2 format applications programs on the BBC.
* Connects to the BBC via 1MHz bus, no restriction on the cable length. OS/M operating system on rom.
* Integral mains psu and 64K on board ram.
* 28 different formats including Acorn Z80, RML 380Z & 480Z, EPSON QX, Amstrad, Osborne etc, supplied on the library disc with the utility to create additional formats.
* Emulates the two of the most commonly used CP/M terminals, HAZELTINE 1500 and ADM-3a in addition to the Acorn VDU making installation of most of the software packages easy.
* Utility to inter convert ASCII text wordprocessed on a standard BBC and under OS/M or CP/M .
* Multiform is fully compatible with Acorn's 8271 and 1770 DFS on models B, B plus and the Master.
* Single density dfs allows single density CP/M format use. Double density dfs allows both single and double density CP/M formats to be used.
* Single or dual, single sided or double sided and 40 or 80 track drives can be used provided that they match the CP/M software format to be run.
* Dual drive will allow two separate formats to operate simultaneously for data transfer making it ideal for use in environment where machines with different formats are in use.
* Utility to read and write on IBM PC DOS discs available as an optional extra. Utility will also format a PC DOS disc.
* Multiform Z80 is supplied with a OS/M operating system rom, System disc and a Library disc. Please specify the DFS type and the drive format when ordering.

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(24 hr viewdata system)
Tel: 01-450 9764

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EPROMER III Eprom Programmer

An enhanced version of the highly successful EPROMER II providing added sophistication to the eprom programming applications on the BBC computer range. The new software also utilises the extra facilities of the BBC Master computer. The programming methods are 'state of the art' of programming technology for fast, efficient and cost effective operation.

The single rail eproms handled by the EPROMER III are:

- 2716 2732 2764 27128 27256 27512 27513 2516 2532 (NMOS & CMOS)
- One time eproms P27XXX, 87CXXX etc.
- Also A suffix eproms such as 27XXXA

The software is menu driven, many operations being single key. On screen help clarifying the operation being carried out. Will make the programming process very simple and easy for both specialists and novices alike.

The main features of the programming software are:

* Device, function and voltage selection from the computer keyboard.
* Continuous display of the options selected.
* All eproms upto 27512 (64K) programmed in single pass.
* Automatic Intelligent identifier support for eproms able to respond.
* Selectable programming voltage 25/21/12.5V
* 3 programming methods: Normal, Intelligent & Pulse (20 sec for a 27128).
* Serial port protocols supported.
* Intel HEX, Motorola S, HEX and ASCII protocols supported.
* DFS/ADFS and Rom Filing System Supported.
* BASIC/Machine Code programming using RFS.
* Powerful editor with input in HEX or ASCII.
* Block move of data within the address range.
* User can select any section of the eprom from single byte to the full address range to blank check/burn/verify. Facility to program single bytes makes program development/amendment simpler.
* Software interface provided for users own application (alternate byte program etc)

EPROMER III interfaces with the BBC through the 1 MHz bus, has a mains integral mains power supply and is fitted with a 3M TEXTOOL ZIF socket to provide consistent and reliable service for a long period.

META Version III

"All the good features you would expect to find in a good source code editor are present . . . Meta assembler lives in a different world. It is structured to work with any new processor . . . as new instruction sets can be added . . . as needed . . . has a well featured editor with colour highlighting, a sound modular approach." **Acorn User October 1986**

- Assembles for over 30 popular processors, including Z80, 6800/01/02/04/05/09/11 etc — and 68000 — using native mnemonics for each processor, eg. LD A, (HL) for Z80 and MOV AO, $1000 for 68000 etc.
- Fully integrated Editor: four field, all search, search/replace, block copy, delete, move, marked save, load etc.
- Compatible with Portal Eprom Emulators and Team Disassemblers.
- Send object code in Intel Hex, S-Record, straight binary etc. down to discs, RS232, parallel port, Eprom Emulators etc — all **during Assembly.**
- Over 50 directives included as standard: handling nestable macros, conditional assembly and twenty types of table definition directives.
- 32 bit labels; 31 character names. Arithmetic and Boolean arithmetic to 32 bits.
- Modular source code with numeric and string parameter passing.
- Serial communicator area with eight options lines: echo, control code trap, LF supression/addition etc.
- Over 500 in use throughout the world in universities and many different industries.
- Two 16K Roms, two 80 track discs, A4 ring-band manual, function-key strip.

PORTAL EPROM EMULATORS

- Emulates 2716, 2732, 2764, 27128, 27256, 27512 eproms at 150ns Access time.
- Load at 4Kbytes/second — No "erase" time.
- 28 pin header plugs into Eprom socket on target system — status monitored on 13 Leds.
- Fully software controlled from Meta Assembler.
- 100 times faster than standard EPROM program/erase cycle.
- Fully CMOS compatible; draws no power from target system.
- Four portals may be independently programmed off same user-post cable.
- Complete with all cables, manual and disc.

PORTAL 128 (2716, 2732, 2764, 27128):
PORTAL 512 (2716, 2732, 2764, 27128, 27256, 27512).

MICROPROMER

An add on unit for Epromer II enabling the user to program 8741, 8748 and 8749 single chip microcontrollers. Now with the aid of cross assemblers such as META, the user can write code for the above devices and then with the aid of Micro-promer program the device.

* Simple menu structure with on screen help. i.e. select a function and on the screen will appear details of the function being performed.
* Comprehensive error reporting and checking.
* Read, verify, blank check, program from 1 to the maximum byte count for the device being used at any address location.
* Support for DFS, ADFS and cassette filing systems.
* Edit data in Hex or ASCII.
* Total control via software, no switches to worry about.
* Supplied with user manual and software on diskette.
* MPROMER simply plugs into the EPROMER II ZIF socket.

TEAM DISSASSEMBLER

The third part of the Universal Development System: a Meta labelling disassembler.

Supports 1802, 8080, 8085, HD64180, Z80, 65XX (includes 65 col, 6511 etc), 68XX (includes 00, 01, 02, 03, 08 etc): updates soon for most of Meta processors.

- Up to 64K of object code translated back into META compatible source code modules: labels automatically inserted on all jump targets, memory references etc.
- Pre-editing stage allows marking of object code areas as byte, string, word, long word etc, tables. These areas dis-assembled into appropriate directives instead of garbage mnemonics.
- Reconstituted source code ready for immediate re-assembly by META.
- Omniversal search/replace for re-naming arbitary label names with meaningful ones.

BOOKS

No VAT Carriage Code (c)

LANGUAGES
6502 Assy Lang Prog............**£19.95**
6502 Programming...............**£13.95**
8086 Book...........................**£23.95**
Acorn BCPL User Guide........**£15.00**
Acorn FORTH.......................**£7.50**
Acorn LISP..........................**£7.50**
Acorn ISO Pascal Ref Manual.**£10.00**
Intro to COMAL...................**£10.00**
Intro to LOGO......................**£7.50**
Micro Prolog Ref Manual.......**£10.00**
Introduction to Turbo Pascal..**£14.95**
Prog the Micro with Pascal.......**£8.50**
The UNIX Book....................**£7.50**
Unix User Guide..................**£19.95**
Understanding Unix.............**£18.45**

BBC MICRO GUIDE BOOKS
BBC User Guide Acorn..........**£15.00**
BBC Plus User Guide............**£15.00**
Drawing your Own BBC Programs.........................**£6.95**
Inside Information................**£8.95**
Math Prog in BBC Basic.........**£7.95**
Toolbox 2.............................**£10.95**
VIA 6522 Book......................**£4.50**

PROGRAMMING/UTILITY
Advanced Sidewise Ram User Guide **£9.95**
Advanced User Guide (BBC)...**£15.95**
Advanced User Guide............**£12.50**
Applied Ass./Lang on the BBC.**£9.95**
BBC Micro Sideways ROM's RAM's **£9.95**
Guide to the BBC ROM...........**£9.95**
Beginners Guide to W.P..........**£7.95**
View 3.0 User Guide..............**£10.00**
Viewstore..............................**£10.00**
Viewsheet.............................**£10.00**
Wordwise Plus.......................**£9.95**

SOUND & GRAPHICS:
Mastering Music....................**£6.95**

DISC DRIVE SYSTEMS:
Advanced Disc User Guide.....**£16.95**
Disc Book..............................**£3.50**
Disc Programming Techniques..**£7.95**
Disc Systems..........................**£6.95**
File Handling on the BBC........**£6.95**
Discovering Disc Drives..........**£POA**

APPLICATIONS:
Interfacing Proj for BBC.........**£6.95**
BBC and Small Business..........**£5.75**

PROFESSIONAL SOFTWARE
Wordstar made easy.............**£16.95**
Introduction to Wordstar.......**£17.95**
Wordstar Handbook.............**£11.95**
dBase-II for the first time user.**£16.95**
Understanding dBase-III.........**£22.95**
Multiplan Made Easy.............**£18.95**
Multimate Complete Guide.....**£16.95**
ABC of LOTUS 123..............**£17.45**
1-2-3 for Business.................**£16.95**
Adv Tech in dBase II/III........**£22.95**
Mastering CP/M...................**£17.95**
CP/M Bible..........................**£16.50**
Introducing CP/M on BBC & Z80...**£9.95**
MS/PC DOS Prompt...........**£10.95**

8

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NOVACAD

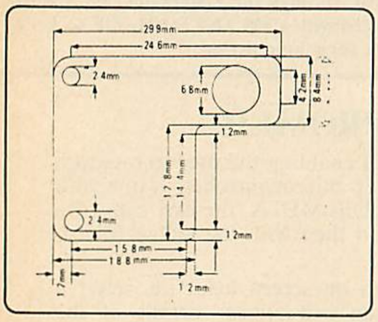
Computer Aided Draughting for the BBC Micro

“ *The Novacad system is a thoughtfully designed piece of software requiring a minimum of manual bashing so that real results are possible with just a few hours work.* ”

“ *Novacad is a professional package, well worth the £90 for the ROM and disc and is expandable to suit your own particular requirements. I would have no reservations if I heard Novacad called, "the best on the market".* ” **A&B Computing August 1986**

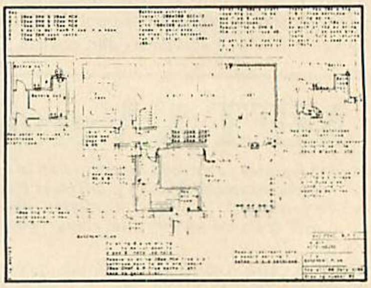
A sophisticated CAD package with unique facilities which are generally confined to the professional CAD packages costing thousands of pounds.

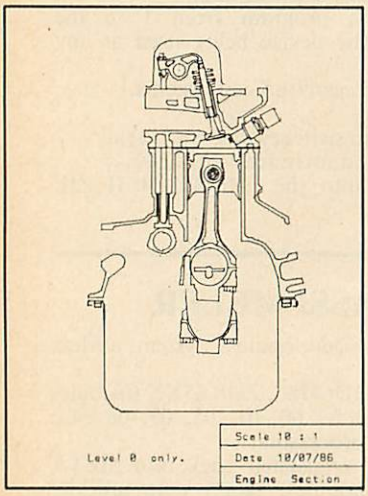
NOVACAD is being used in widely differing fields ranging from leading British industries for producing engineering drawings to Accountants' offices for producing flow charts. Architects, engineers, plumbers, kitchen planners and many other professions requiring easy to use facilities for producing professional quality output are making extensive use of NOVACAD's unique features. NOVACAD is proving to be a invaluable teaching aid in technical schools and colleges simply because of the ease with which it can be used.

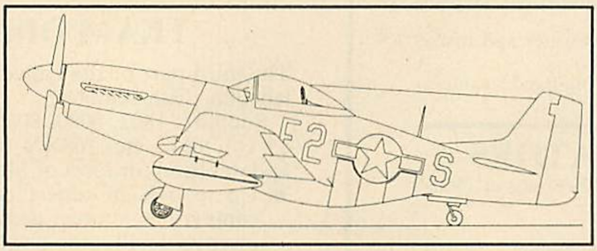


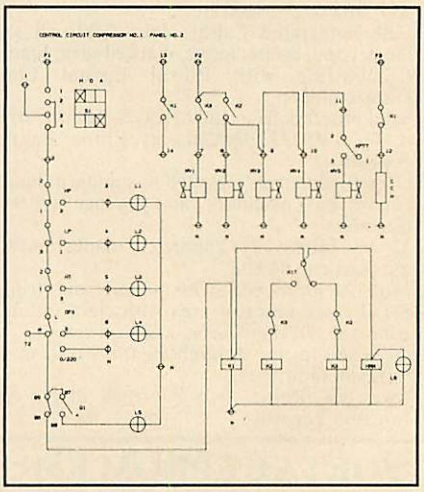
The major features of NOVACAD are:

* Simple and easy to use with logical command sequence.
* A large drawing area (approx 15 screens).
* The ability to create complex icons (upto 500 lines instead of the usual 15 to 20 pixels), store them in a library and recall them at different scales and orientations.
* A zoom facility allowing magnification of up to 20 times to insert finer details.
* Block copy of shapes on the screen for repetitive use.
* Text entry at any 90° orientation at any position on the screen.
* Create multi layer drawing with 8 levels available.
* Full compatibility with the BBC range with minimal hardware requirements yet having the capability of exploiting the potential of the extra shadow memory or the second processor's memory and speed.
* Printer routine for Epson 80 and 136 column printers.
* A unique facility to output to any BBC compatible plotter.









MINIMUM HARDWARE REQUIREMENTS

- **Any BBC range computer with Acorn DFS.**
- **40 Track single sided single drive.**
- **Epson compatible dot matrix printer.**

With basic BBC B, NOVACAD operates in mode 4 allowing use of any 2 colours. With shadow memory of the BBC+ or the Master, it can also operate in mode 0 for higher resolution or mode 1 for allowing use of any 4 colours, and it will provide additional user memory for more complex drawings.
6502 second processor or the Turbo on the Master will also increase the drawing speed considerably.

NOVACAD is available in two versions

*BASIC version for cursor control from the keyboard.

*T/M version for cursor control from the keyboard, Tracker Ball or a Mouse.

OPTIONAL EXTRAS

Plotter driver generator is available as an optional extra to configure a plotter routine for any BBC compatible plotter. Pre-configured programs for the popular plotters like **Epson HI 80, Hitachi 672, Plotmate, Penman** and **HP GL.** This program allows the drawing to be scaled to the maximum plotter size thus enabling drawing of A2 and A3 sizes to be produced with equal ease. The zoom facility will enable inaccuracies of drawing on the screen to be eliminated.

ROUTCAD, an optional software package for our Graphics Workstation allows for production of shapes drawn using NOVACAD in 3D on suitable material and is ideal for a range of applications including template making and model building.

NOVACAD package includes a 16K ROM, Utility disc and a comprehensive manual.

LETTERS

Write to Letters, Acorn User, 141-143 Drury Lane, London WC2B 5TF

JUST ANOTHER MINORITY GROUP

Sir, You asked to hear from women, but did not say what you wanted to hear. My collection of *AU* only goes back until the date I bought a Master.

You mention the male domination of computing. I find this no more off-putting than the domination of certain areas of computing by other groups to which I do not belong, such as arcade games players and teachers.

I have been computing at home for four years and at work for three and a half. I use my home computers for wordprocessing and adventure games mostly. I am pleased with the Master except for the major fault with the batteries. I find plenty of interest in *Acorn User* – only getting stuck occasionally by lack of experience.

I am waiting for the internal modems and large adventure games to arrive for the new computer. I still have to buy Spectrum tapes to get good new games. So what else was it you wanted to know?

Sheila M Thomas
Cambridgeshire

WOMEN ARE NOT DIFFERENT

Sir, With regard to your plea (September) to the silent majority, women. There are plenty of us reading your magazine with enjoyment, but there's little need to treat us differently. It was I who bought the computer, disc drive and printer. I do some programming (and play a few games). I taught my husband wordprocessing. And I'm the one who buys your magazine, and enjoys it!

A S Clark
Somerset



Master Compact: wrong price and lacks cassette outlet

THE PRICE ISN'T RIGHT

Sir, With reference to the Master Compact: as the saying goes, nice micro, shame about the price. How do Acorn do it? They release a new micro, a good one at that, and then price it out of the mass market.

Can they justify the price of the basic Compact + disc drive when you can buy an Amstrad + disc drive + colour monitor for very close to the same price? The Compact with disc and monitor comes in at about £200 dearer than the Amstrad. If you were in the market for a computer which would you buy?

I appreciate the Compact's built-in software, but does the general public? Don't get me wrong – I am a confirmed Acorn user. I have an Electron, Plus 1 etc, and the pricing policy on that was way out of line with market trends. I bought mine when it dropped to £129 but I have heard of it going for £49.

The Electron could have been for Acorn what they want the Compact to be. It is amazing that it is still going strong, as the support from Acorn has been deplorable. I remember the ads for it stating that it would eventually be upgradable to a BBC B. Apart from third party add-ons, all that Acorn have supplied are a joystick, printer, ROM interface (Plus 1) and disc drive (Plus 3). Where was their teletext mode 7 adaptor, hardware sideways scrolling, user port, 1MHz bus?

I was moved to write this letter because I hope that the same fate does not befall the Compact. Unless Acorn get their pricing policy sorted out, their days as a computer manufacturer are numbered.

J A Nunn
Hampton, Middx

SEARCH FOR A STAR

Sir, I am interested in astrology but have not been able to trace any relevant software on the subject. Can you help?

Heather Smith
Ayr

We've never come across anything along those lines. Over to you, readers!

COMPACT COMPATIBILITY

Sir, If, as stated in the review in your October issue, the Master Compact lacks a cassette outlet, then that is most unfortunate.

Of course no one in their senses would want to use tape for ordinary purposes, but tape is still the only common medium for various Acorn machines which are basically compatible but may have disc drives of different formats connected to them, or may be fitted with different and incompatible DFSs. In the absence of a tape outlet, there is no easy way the owner of a Master Compact will be able to exchange programs or data files with owners of other Acorn models unless they happen to have a 3.5in disc drive and compatible DFS.

Ruben Hadekel
London

There is no cassette port on the Compact, but we believe it will be possible to add one. Keep your eyes on the news pages and advertisements.

Advanced Computer Products claims that the Advanced 1770 DFS is Compact, BBC micro and Master compatible, and several dealers are now stocking disc cables to link 5.25in drives to the Compact. This set-up would allow you to run BBC B discs.

Also, in January David Atherton will explain how to transfer software between the Compact and other BBC micros using the RS232 port.

Readers who need a user port on the Compact should contact Resource, who market an add-on cable to allow use of devices such as the Concept Keyboard and turtles. Resource is at Exeter Road, Doncaster DN2 4PY. Tel: (0302) 63800.

MEP LIVES ON IN ESSEX

Sir, 'Hope for the future of MEP centres' (October) suggests that the Eastern Region has passed into oblivion. No so! When no further funding was available the Inspectors/Advisers of the eight LEAs (Norfolk, Suffolk, Essex, Havering, Redbridge, Waltham Forest, Newham and Barking and Dagenham) agreed to keep the Region active as a consortium of advisory staff. As the former Regional Director I have remained a focal point for the activities of the Region and its postbox.

We still hope that MESU will see the wisdom of supporting our voluntary efforts. We keep our links with other MEP centres and welcome further co-operation.

David Want
Essex Institute of Higher Education

MORE COMPACT COMPLAINTS

Sir, I was pleased to see your reviewer Steve Mansfield taking a swipe at Acorn for not including essential manuals with the Master and being late with the Advanced Reference Manual. But neither your review of the Compact nor Acorn's advertisement gives any indication as to what manuals (if any) are thrown in with this computer.

You also follow Acorn in quoting VAT-less prices. For a computer aimed specifically at the home this is indefensible. The comparison with Amstrad's PCW 8256, which is mainly a business computer, is irrelevant.

I am tempted to guess that the true cost of the basic Compact will be more than £500 once manuals and VAT are added. I cannot understand how it can be said to be £250 cheaper. If the disc drive is worth £100 the difference is only £140. And what about the 100 titles available at launch? Presumably 'available' has its usual Acorn meaning of 'perhaps available in three months' time if you are lucky'?

On another subject, *ViewPlot* was advertised as long ago as last November. Where is it? You seem to imply that *Overview* (which contains *ViewPlot*) is available. Is it?

Finally, perhaps you could ask Computer Concepts why they do not point out that neither *InterWord* nor *InterSheet* works on a 6502 second processor. Their adverts omit this essential information. Surely their 32k ROM could have been split into a language ROM and a service ROM, whereupon only 16k of code would be copied into the second processor? And what about *InterBase* and *InterChart*? Software of this sophistication needs all the memory and speed it can get.

Anon

We unfortunately lost the name and address of this correspondant but felt the letter well worth including.

The Compact manuals are: User Guide (also covers ABC), Logotron Logo Guide, *View* quick reference chart and *View/ViewSheet* keystrip. The standard of documentation is as poor as for the Master.

Cost comparisons are fraught with dangers (we can't remember how £250 came about either), so we'll leave that to the reader. What we will say is that the Compact is a very neat, well-produced, friendly and usable computer – a combination that you will not regret spending your money on.

If anyone did manage to buy a Compact disc in September they deserve a medal. We've had lots of phone calls from readers who couldn't.

***ViewPlot* has been advertised and *Overview* should be around. It's crazy, but Acornsoft doesn't appear to be trying to sell these products.**

Charles Moir at Computer Concepts explained: 'Acorn did not design the second processor system to work with 32k ROMs. If we were to "bodge" it, which could theoretically be done, it would be slow – with *InterWord* impossibly so – and would increase the size of the code. It would have been nice to have the *Inter* range work on the second processor, but it wasn't really on.'

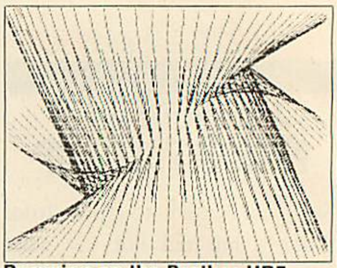
The adverts don't specifically point out the second processor incompatibility, but they do say what the *Inter* series does work with. Also shadow RAM boards go a long way towards solving memory problems. For a full review of *InterWord*, see pages 154–160 of the November issue of *Acorn User*.

DUMPING ON THE BROTHER

Sir, There must be many of your readers who have opted for the Brother HR5 thermal printer because of its low cost. The machine works well enough for text but problems are usually encountered with screen dumps. The normal Epson code works on the basis that the printer head moves down in 1/72in units and sends code to move the head by eight such units. Unfortunately the Brother works in 1/36in units and is therefore moved down by two line depths instead of one, leaving blank horizontal lines in the print-out. Your screen dump by Martin Phillips (Hints and Tips, September '86) is easily modified so that it works perfectly on the HR5. The following change should be made to listing 5 and 6:

```
430 LDA #4
```

The checksum in line 1290 should then be 17935 for listing 5 (modes 1,2,4,5) and 17999 for listing 6 (mode 0).



Dumping on the Brother HR5

The two dumps will then function as described in the article and add a much needed facility to this good machine.

K Palfreyman
S Yorks

CARTRIDGE CARPING

Sir, I was enraged by Acorn's comment (Letters, October) that people don't use cartridges properly. I have just spent 30 minutes struggling to inset the Novacad and AMX ROMs into a cartridge and the cartridge into its socket. I have eventually succeeded but can use only one of the sockets because the edge of the sprung lid of the socket does not lie flush with the bar holding it, but sticks out.

Since ROMs vary slightly in size (and who should be surprised in view of the number of countries making them?), it's a disaster when you try to fit a slightly protruding ROM in its cartridge, into a socket that is smaller than it should be because of poor design or manufacture.

And what about getting them out of the cartridges? Certainly you can lever them out with a screwdriver but each time you do so, a dent is left on the elegantly styled (and functionally useless) lower edge of the cartridge case. Does Acorn seriously think I can afford half a dozen cartridges to keep my increasing number of ROMs in permanently? Watford, where are you? I miss my ZIF socket.

Dawn Walker
Wellington

SECOND THOUGHTS

Sir, I am always surprised by the high quality and originality of programs in *Acorn User*. However, I have noticed that some programs originally classified as not compatible with the 6502 second processor may need only a small alteration to overcome this. There are some simple guidelines which would make a greater proportion of programs compatible.

The main problem is that screen memory is no longer directly 'pokeable' over the Tube. This is not such a problem with loading or saving screens. All that is needed is to precede the *LOAD and *SAVE parameters with FFFF to signify that it is the BBC's memory being accessed, not the second processor's. For example, to save a mode 1 screen the following command is used:

*SAVE screen FFFF3000 FFFF8000

To poke or peek a location in the BBC's memory, the following routines may be used:

```
   10 REM 6502SP Peek and P
oke
   20 REM by Ian Gibson
   30 DIM X% 20
   40 Y%=X% DIV 256
   50 osword=&FFF1
   60 REM your program here
   70 :
   80 END
   90 :
  100 DEF FNpeek(addr%)
  110 !X%=addr%
  120 A%=5
  130 CALL osword
  140 =X%?4
  150 DEF PROCpoke(addr%,da
ta%)
  160 !X%=addr%
  170 X%?4=data%
  180 A%=6
  190 CALL osword
  200 ENDPROC
```

Thus, many problems in compatibility may be overcome. These routines work on a BBC without second processor, and they are easy to convert to machine code. Obviously, it is not practical to do this to all programs, especially games which poke screen memory at high speed. However many programs can benefit from the increased speed and memory which the 6502 second processor has to offer.

I recently converted the *Acorn User* Pixel Editor to run with the Tubelink program over the Tube. It gave a more responsive edge to the program as well as increasing room for individual expansion.

Ian S Gibson
Maidstone

INTER-ESTING INFORMATION

Sir, BBC owners who have purchased the new word-processor ROM, *InterWord* from Computer Concepts, may



InterWord: first impressions

be interested to know that files saved with Gemini's *Office Mate* disc-based wordprocessor may be loaded without problems. Some garbage needs to be edited out but this is easily accomplished using the marked sections routine.

Early impressions using *InterWord* are most favourable although it is necessary to upgrade the standard BBC with a Shadow RAM card such as the Aries B32 board if documents of any size are needed.

E B Page
Alloa

CALLIGRAPHICS ON THE LX-80

Sir, I have been using Mike Turner's Calligraphy program (*AU*, September) with an Epson LX–80 printer. It works well for the listing printed in the magazine but to get the enhanced version on the *AU* listings disc to work, several lines must be deleted, ie: 1720, 1730, 1790, 1800, 1810, 1820, 1830, 1890 and 1900.

Also, line 390 should be altered to VDU1,27,1,51,1,12; and in line 1780 change the "T" to "&".

Valerie Britton
Bristol

PROGRAMMING IN GCSE

Sir, The letter from Joe Telford in the October issue gives a misleading impression of what is expected to occur in the GCSE Computer Studies classroom.

It is true that, for examination projects, the emphasis is on the realistic use of computers rather than trivial programming exercises, but in order to make a sensible choice of method of solution, candidates must have first hand experience of the various alternatives. These range from the use of an application package, through the incorporation of library routines and procedures into the candidate's program, to a program written entirely by the candidate. Consequently, as part of the teaching, pupils would be expected to acquire skills in each of these areas.

It is not true that the new Information Technology courses are 'taking over' the previous role of Computer Studies in accepting 'the role of programming as a necessary part of problem-solving'. Computer Studies certainly still recognises this role of programming, but not that every solution to every problem must necessarily be programmed from scratch. The essential distinction between modular IT syllabuses and Computer Studies syllabuses at GCSE level is that the former are skills-based and assess each practical activity separately, whereas the latter assess practical achievement by means of one major project (though marked at various stages in its development). There are, of course, some IT syllabuses which do not include programming at all.

Programming activities in other subject areas are usually small-scale and to serve an immediate purpose. This is different from the wider applicability and longer term relevance of the computerised solutions expected of a Computer Studies student.

Alan R Hunter
Head of Computing
Marton Sixth Form College
Middlesbrough

SWITCHING THE OS

Sir, A friend of mine has a BBC model B+ computer and was experiencing the same sort of software incompatibility problems as some other readers have. Typical problems included *Castle Quest*, where the graphics were all mixed up, and *Repton 2* – which seemed fine until an egg was dropped. When this egg hatched the program would always crash.

The solution was to replace the operating system of the B+ with the OS1.2 for the model B. With this change all was well.

Of course some OS commands (eg *SHADOW) no longer work (unless the proper OS is replaced), but at least the games work correctly.

In fact what was finally done was to build a small pcb to hold both operating systems, with a manual switch mounted at the rear of the computer, so that either OS could be used (selected before power-up).

I don't know if this method will work for all problem software or even for different issues of the B+ main circuit board; perhaps someone could try testing this out.

I D Twydell
Middlesex

I NEED A NEW HEAD

Sir, My problem concerns my printer. I have a Kanto Denshi Coporation FT-5001 and the head has broken. I have examined it carefully and the two lower pins have snapped, rendering them useless. So, I require a new head. I have telephoned my dealer but in the two and a half years since I got it the importers have ceased trading and after two weeks he has still not discovered another supplier, but I suspect his heart isn't really in it.

So my question is: where can I obtain a new head for my printer?

The head has the usual nine pins (no NLQ) and is of the sort where the ribbon cartridge travels along with the head. The mechanism is apparently based on one of the Panasonic models, but I have no idea which one. The head connects to the printer with a flat flexible cable which is permanently fastened to the head, with a removable connector where it joins the printer base. The head is 40mm wide, 20mm deep and 50mm high, with the inscription 'CAUTION HOT SURFACE AVOID CONTACT' on a label. The only other distinguishing feature on the printer is a label saying 'Logitec GmbH', presumably a German company.

I hope this is sufficient information for you to come up with an answer.

Tony Cains
Stockton-on-Tees

We haven't been able to locate a supplier for the Kanti Denshi Corp printer. Can any reader offer any help? In the meantime, you should keep your eyes on our Free Ads page, in case one comes up for sale (for spares).

GET ON BOARD

Sir, I have just started to buy your magazine, and I'm thoroughly impressed with the quality of the articles and programs. It is certainly one of the best magazines available for the BBC micro and Electron.

I started a bulletin board back in February, running on a BBC micro, which has given me hours of pleasure.

Name : Techno Fresh Sytems
Hours: 24 hours
Phone: 0570-423082
Speed : 300/300 only
Sysop : Llew Dickinson

The board has software reviews, as well as loads of software for BBC users to download into their computers.

If anybody does call, please leave a message or two!

Llew Dickinson
Lampeter

TERMINAL PROBLEM

Sir, I am writing to ask about the use of a BBC micro as a terminal. At Bath University BBCs are used as on-line terminals connected through the RS423 port. A ROM called the Bath Terminal Emulator and another named the Extended Programmable Interface Connecter (EPIC) enable the micro to be used as a terminal. We have managed to insert characters into the keyboard buffer remotely by sending the relevant FX call to the processor. Similarly we have managed to simulate all * commands and VDU commands.

We are now trying to use the BBC Basic ROM remotely so that we can run a file held in the mainframe computer. As far as I can see, we can run a program but I don't know how to recover the results.

Is it possible to sense what the BBC is doing through the RS423? It seems a shame that the BBC chip is idle.

(Signature illegible)
Glastonbury, Somerset

Basically, what you are trying to do is to look into the BBC and pull out the results. This is impossible! The only way you are going to get the information back is to get the remote BBC to send it to you. After all you wouldn't expect to look down a telephone line and get pages from Micronet; you rely on Micronet to send them to you.

Torch has however done more work on this. Torch Computers, Cibyn Industrial Estate, Caernarfon, Gwynedd LL55 2BDD.

POST A PROBLEM

AS a result of pressure from readers, *Acorn User* now guarantees a fast reply service for enquiries. Your answer will be returned within 10 working days for just £2 (includes VAT), or your money back.

The idea is simple. Just write out your problem, fill in the coupon (right), and send both off to *Acorn User* with a stamped addressed envelope and cheque or postal order for £2. (If you want recorded delivery, add the cost of this on. The same goes for overseas readers.) Include as much detail as possible and a disc or cassette if a program is involved – with enough space to record any corrected listing.

We will then answer the problem and return all material received – within a guaranteed *10 working days* from receipt. If we fail to match this promise your cheque or postal order will be returned with the answered question. If we cannot answer the problem, the cheque will be sent back to you.

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ACORN USER READER SERVICE
141-143 Drury Lane, London WC2B 5TF

NAME ____________

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I enclose a cheque/postal order for £2 and an sae with my problem.

OFFICE USE ONLY Date in:
Date out:
Answered by:

FLOATING POINT IN ASSEMBLY

Sir, Please could you tell me how to use floating point calculations in assembly language. I can write simple programs but the problem arises while trying to convert Basic to assembly. My first encounter was while converting the mapping routine on your excellent Freehand art package. The trouble is that it runs very slowly. Could somebody explain the assembly floating points or give a listing of the assembly routine for mapping and copying?

Damon Futter
Wiltshire

There are now good texts on floating point machine code, although you can get the theory from a good A-Level maths book and apply this. Your best bet might be to make use of the Basic ROM routines detailed in *The Basic ROM User Guide* by Mark Plumley, published by Adder Publishing in Cambridge.

MASTER PLAN FOR 40/80 DRIVES

Sir, I am writing in reply to Andrew Megginson's letter (October) about problems running dual format discs with the Master 128.

I have 40/80 track switchable drives and have encountered problems trying to load Acornsoft 40 track DFS discs with the drives in 40 track mode. I was just about to unpack my cassette recorder when I decided to switch my drives into 80 track mode and use the command *DRIVE 0 40 which converts drive 0 into 40 track mode via software. To my delight all the discs worked the first time.

Many Acornsoft discs have a utility to convert them from 40 to 80 track format. Before using this utility it is best to select 40 track mode for Drive 0 using the above command, format a blank disc and transfer the original to it by using the command *COPY 0 0 *.*. This method is far more reliable than using BACKUP or the utility on the disc itself, and if anything does go wrong you still have the original disc in perfect condition.

Making security copies of 40 track ADFS discs is not as easy, as the various utilities provided would be different to follow for those not used to this filing system. If using switchable drives ensure that the drive is in 80 track format before converting the disc to 80 tracks. If the drive is in 40 track mode during the conversion the disc may become unreadable.

Stuart Birkett
Devon

SOFTWARE FOR SURVEYORS?

Sir, We are a firm of Chartered Building Surveyors who are regularly required to carry out long and repetitive calculations on the size and deflection of steel and timber beams. We have a BBC B micro and would like to realise its potential in this connection.

We have endeavoured to find some software which might be of use but have been unsuccessful. Please can you put us in contact with a company which produces or may produce a software package which would be suitable.

Peter Thatcher
Michael J Daniels
Wokingham, Berks

We don't know of any: perhaps someone can help?

PROGRAMMING PROJECT

Sir, As a serious BBC micro owner I've mastered both Basic and machine code. I can boast to knowing the machine virtually inside out. Despite this, I've never completed any worthwhile programming project – the sort of thing that gets published in the pages of your magazine or sold to a software house.

I find one of the main problems is getting enough motivation together to keep at it for the three months or so necessary to produce a number one hit.

This has given me an idea for setting up a new user group for the BBC micro.

I hope to get together a group of programmers to combine expertise and perhaps work on joint programming projects, sharing the work load involved. If your readers are at all interested then I ask them to write to me for more details.

Paul Phillips
13 Mountain Road
Conwy
Gwynedd
LL32 8PU

TWO-WORD WORDGRID?

Sir, Joe Telford's listing to create your own wordsearch puzzles (listing 2, July '86) appears to have an error in it. If you try to create a wordsearch puzzle with only two words then the program crashes and the error 'Subscript at 3590' appears.

If line 3910 is altered from:

```
3910 IF words%<2
PRINTr$"Bad
wordlist!":PROCdelay:END
PROC
```

to:

```
3910 IF words<=2
PRINTr$"Bad
wordlist!:PROCdelay:
ENDPROC
```

then the problem is solved.

L Bamford
Stockport

The fix works fine, but why use word grid puzzles with only two words? Joe's programs were designed to do any serious sorting.

CONTROL CODES FOR THE COPAL

Sirs, I am replying to Tom Oswald's letter (September) with a mode 0 screen dump for a Copal 1000 printer.

I too am frustrated about the control codes of the Copal being different from those of the Epson. Also the printer lacks quite a lot of other capabilities like user definable characters, NLQ or even just italics.

```
   10 REM Mode 0 dump
   20 REM by Tom Weber
   30 REM for BBC B/B+/M/C
/E with Copal 1000
   40 REM (c) Acorn User D
ecember 1986
   50 :
   60 MODE 0
   70 DIM X% 80
   80 INPUT "Name: "n$
   90 $X%="LOAD "+n$+" 300
0"
  100 Y%=X% DIV 256:CALL &
FFF7
  110 PROCdump
  120 END
  130 :
  140 DEF PROCdump
  150 *FX 3,10
  160 VDU 27,65,8
  170 FOR C%=&3000 TO &327
8 STEP 8
  180 VDU 27,75,0,2
  190 FOR A%=C%+&4D80 TO C
% STEP -640
  200 FOR B%=A%+7 TO A% ST
EP -1
  210 VDU ?B%,?B%
  220 NEXT:NEXT
  230 PRINT
  240 NEXT
  250 *FX3,0
  260 ENDPROC
```

Mode 0 dump for Copal 1000

In my opinion, for the same money you can buy a printer that is a lot more versatile than this one.

About your magazine, I find it rather enjoyable, although I must say that I would prefer a few more serious articles than always just having programs that enable me to print in double height.

Finally, is there somebody out here in Germany who would like to swap information and programs with me? After all, not many have got the Beeb over here. My address is: Saldernstrasse 22, 3000 Hannover 71, Germany.

Tom Weber
Germany

HINTS & TIPS

A way for printing on screen and calculating prime numbers are among this month's offering from Martin Phillips

DOING THE SPLITS

Many programs require text to be printed out on the screen. This is quite easy to program using the Print statement:

10 PRINT"This is the first line of text."
20 PRINT"This is the next line."

This is the quickest way of putting text on the screen. A problem can occur when wanting to change the first few lines of a long passage of text, such as the instructions at the start of a program. Often this means changing all the Print statements, and I suspect that most readers faced with such changes in the past must have wondered whether there was an easier way.

It is useful to have a routine that will read data statements and then print them out on the screen, taking care to start a new line only when there is a space or a hyphen. Such a routine makes use of the LEFT$ and MID$ statements, and as such can be rather confusing. Therefore let's look at the procedure step by step:

1. Decide on the width of print (w).
2. Read a data string into a string variable (text$).
3. Split the string up into smaller chunks that will fit into the given width. The split must occur at a space or a hyphen. A problem can occur if there is no convenient place to split. In this case a hyphen must be inserted and an artificial split made.
4. Print each chunk of the text.
5. Repeat with the next data string.

Lines 60 and 80 of listing 1 show how a string of data is put into the string variable text$. Splitting this string up into lengths of, say, 30 characters is not easy. This is done by setting a pointer 30 places along the string and working back until a hyphen or a space is found. Lines 150 and 170 perform this function.

The pointer is set to position 32. It is immediately reduced to 31 by the N%=N%−1 part of line 150. If position 31 is a space then the first chunk will be 30 characters long, which is what we want. The actual position where a space is found is given by the variable N%. Then comes the task of splitting up text$ to remove the first N% characters. Line 190 prints the first N% characters of text$, and line 200 removes those characters, plus the space, from the string. The process is repeated until all the string has been printed. If the routine cannot find a convenient space to split the string, then a hyphen is inserted.

```
   10 REM Hints & Tips -
 listing 1
   20 REM by Martin Phil
lips
   30 REM for BBC B/B+/M
/E
   40 REM (c) Acorn User
 December 1986
   50 :
   60 READ text$
   70 PROCformat(5,30)
   80 READ text$
   90 PROCformat(10,20)
  100 END
  110 :
  120 DEF PROCformat(x%,
w%)
  130 IF LEN(text$)<=w%
THEN GOTO 220
  140 N%=w%+2
  150 REPEAT
  160 N%=N%-1
  170 UNTIL MID$(text$,N
%,1)=" " OR MID$(text$,N
%,1)="-" OR N%<1
  180 IF N%=0 THEN text$
=LEFT$(text$,w%-1)+"-"+M
ID$(text$,w%):GOTO130
  190 PRINTTAB(x%);LEFT$
(text$,N%)
  200 text$=MID$(text$,N
%+1)
  210 GOTO 130
  220 PRINTTAB(x%)text$
  230 ENDPROC
  240 :
  250 DATA "These instru
ctions should be ignored
. They have no relevance
 to anything else you mi
ght need here. They do s
how, however, the automa
tic word formatting rout
ine that I am so proud o
f."
  260 DATA "ABCDEFGHIJKL
MNOPQRSTUVWXYZabcdefghij
klmnopqrstuvwxyz12345678
90"
```

Listing 1. Formatted and unjustified text

It is a shame that there is no Basic command to insert a character into the middle of a string. Line 180 shows how this has to be done. LEFT$ splits off the left-hand 29 characters, then a hyphen is added (this makes the thirtieth character) and finally the MID$ without the third parameter adds the rest of the text, starting with what was the thirtieth character.

Finally, there needs to be a test to see whether there is more text to split up or whether the rest will fit on one line. Line

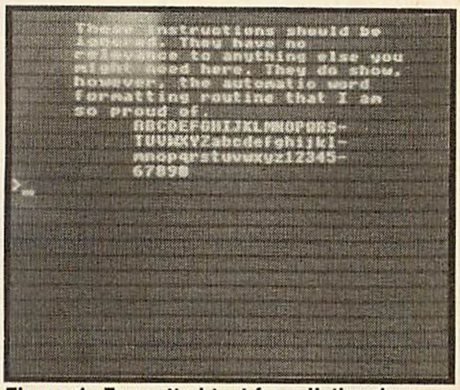


Figure 1. Formatted text from listing 1

130 does this, and line 220 prints that last line. Putting the test here does trap a data statement where the whole text will fit onto one line, otherwise the routine would still split the last word from the text and print that on the next line.

To make the routine more versatile, the two parameters for the format procedure give the left-hand indent and the width of text. As these are used in a procedure there is no checking to make sure that they are sensible. Setting the width to one produced a beautiful line in hyphens! Experiment with listing 1 to see how the text can be moved about the screen.

It was while I was writing a routine to justify the text and getting bogged down with MID$ and LEFT$ that I thought there might be a neater way of manipulating such strings. The seldom used, but tremendously versatile string indirection operator might just be able to perform this task more elegantly. The string indirection operator actually stores a string in a memory location, and the variable associated with it gives the starting point of the string. The end point of the string is marked by a carriage return (code 13) and operates in the following way:

10 DIM string 50

```
20 $string="Acorn User"
30 PRINT $string
```

Line 10 is used to dimension space for the operator. You could put the string in a specific location if so desired:

```
10 string =&900
```

will put the string into memory starting at location &900. The starting location could now be changed:

```
40 string=string+6
50 PRINT $string
```

Now the program will print just 'User'. To do this with the normal string handling statements you need to say:

```
10 string$="Acorn User"
20 PRINT $string
30 string$=MID$(string$,6)
40 PRINT $string
```

or alternatively:

```
30 PRINT MID$(string$,6)
```

You will have noticed that the $ sign is put first. This is to differentiate it from a normal string operator. String indirection operators can be used in much the same way as ordinary strings.

Listing 2 is very similar to listing 1, but avoids much of the use of the Basic string handling commands LEFT$ and MID$. Such a routine is also easier to convert to assembly language if speed is important. Line 210 removes any leading spaces in the line of text. All it does is to move the pointer one place along if it is pointing at the start of the string, much neater than having to use LEFT$ and MID$.

The next step is to introduce a procedure to justify the full lines of text. Line 190 of listing 2 needs altering to:

```
190 PROCspread(LEFT$($A,N%))
```

Then the new procedure inserts spaces until the line is the correct width. Here the string indirection operator makes the task much simpler. First it removes any trailing spaces in the string (line 280), and then goes through the string inserting an extra space after each space until the string is the correct length. If all the spaces have been doubled up and the string is still too short, then it goes round again, putting a third space in, and so on until the line is the correct length (see listing 3).

A routine such as this can be made more useful by allowing codes to be inserted in the text eg, to start a new page or to continue on the same line. This could be achieved by using the '|' character followed by a number or letter for various effects. The '|' can then be inserted in the data statements, the end being most convenient.

An interesting point is speed. Often changes in methods of programming lead to differences in speed, however listing 1 and listing 2 both take exactly the same time to run!

The following back issues contain articles and information on the use of strings and how to handle them:

Strings, October 1982, page 24
Handling arrays, July 1983, page 39
Hints & Tips, April 1984, page 50
Hints & Tips, September 1984, page 50
Hints & Tips, December 1984, page 52
Strings Unknotted, April 1985, page 46

```
10 REM Hints & tips - listing 2
20 REM by Martin Phillips
30 REM for BBC B/B+/M/E
40 REM (c) Acorn User December 1986
50 :
60 DIM A% 255
70 READ text$
80 PROCformat(5,30)
90 READ text$
100 PROCformat(10,20)
110 END
120 :
130 DEFPROCformat(x%,w%)
140 $A%=text$
150 IF LEN($A%)<=w% THEN GOTO 230
160 N%=w%+1:REPEAT:N%=N%-1
170 UNTIL N%?A%=32 OR N%?A%=45 OR N%=0
180 IF N%=0 THEN $(w%+A%-1)="-"+$(w%+A%-1):N%=w%
190 PRINTTAB(x%)LEFT$($A%,N%)
200 A%=A%+N%
210 IF ?A%=32 THEN A%=A%+1:GOTO210
220 GOTO150
230 PRINTTAB(x%)$A%
240 ENDPROC
250 :
260 DATA"These instructions should be ignored. They have no relevance to anything else you might need here. They do show, however, the automatic word formatting routine that I am so proud of."
270 DATA"ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz1234567890"
```

Listing 2. An alternative approach to listing 1

```
10 REM Hints & tips - listing 3
20 REM by Martin Phillips
30 REM for BBC B/B+/M/E
40 REM (c) Acorn User December 1986
50 :
60 DIM A% 255,B% 80
70 READ text$
80 PROCformat(5,30)
90 READ text$
100 PROCformat(10,20)
110 END
120 :
130 DEFPROCformat(x%,w%)
140 $A%=text$
150 IF LEN($A%)<=w% THEN GOTO 230
160 N%=w%+1:REPEAT:N%=N%-1
170 UNTIL N%?A%=32 OR N%?A%=45 OR N%=0
180 IF N%=0 THEN $(w%+A%-1)="-"+$(w%+A%-1):N%=w%
190 PROCspread(LEFT$($A%,N%))
200 A%=A%+N%
210 IF ?A%=32 THEN A%=A%+1:GOTO 210
220 GOTO 150
230 PRINTTAB(x%)$A%
240 ENDPROC
250 :
260 DEFPROCspread($B%)
270 jump%=1
280 IF B%?LEN($B%)=32 THEN B%?LEN($B%)=13:GOTO 280
290 J%=1:REPEAT
300 IF J%?B%=32 THEN $(J%+B%)=" "+$(J%+B%):J%=J%+jump%
310 J%=J%+1
320 UNTIL LEN($B%)=w% OR J%>=w%
330 IF J%>=w% AND LEN($B%)<w% THEN jump%=jump%+1:GOTO 290
340 PRINTTAB(x%)$B%
350 ENDPROC
360 :
370 DATA"These instructions should be ignored. They have no relevance to anything else you might need here. They do show, however, the automatic word formatting routine that I am so proud of."
380 DATA"ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz1234567890"
```

Listing 3. Formatted and justified text

ILLUSTRATION BY AXEL SCHEFFLER

PRIME NUMBERS

Listing 4 is a short program to print out all the prime numbers between 3 and 99999. It works by storing all the prime numbers directly in memory.

The starting point for this memory store is J% and its location is &2000. The prime numbers are accessed using the word indirection operator '!'. An integer is stored in four bytes of memory, and the word indirection operator will retrieve an integer. P% is the pointer where the next

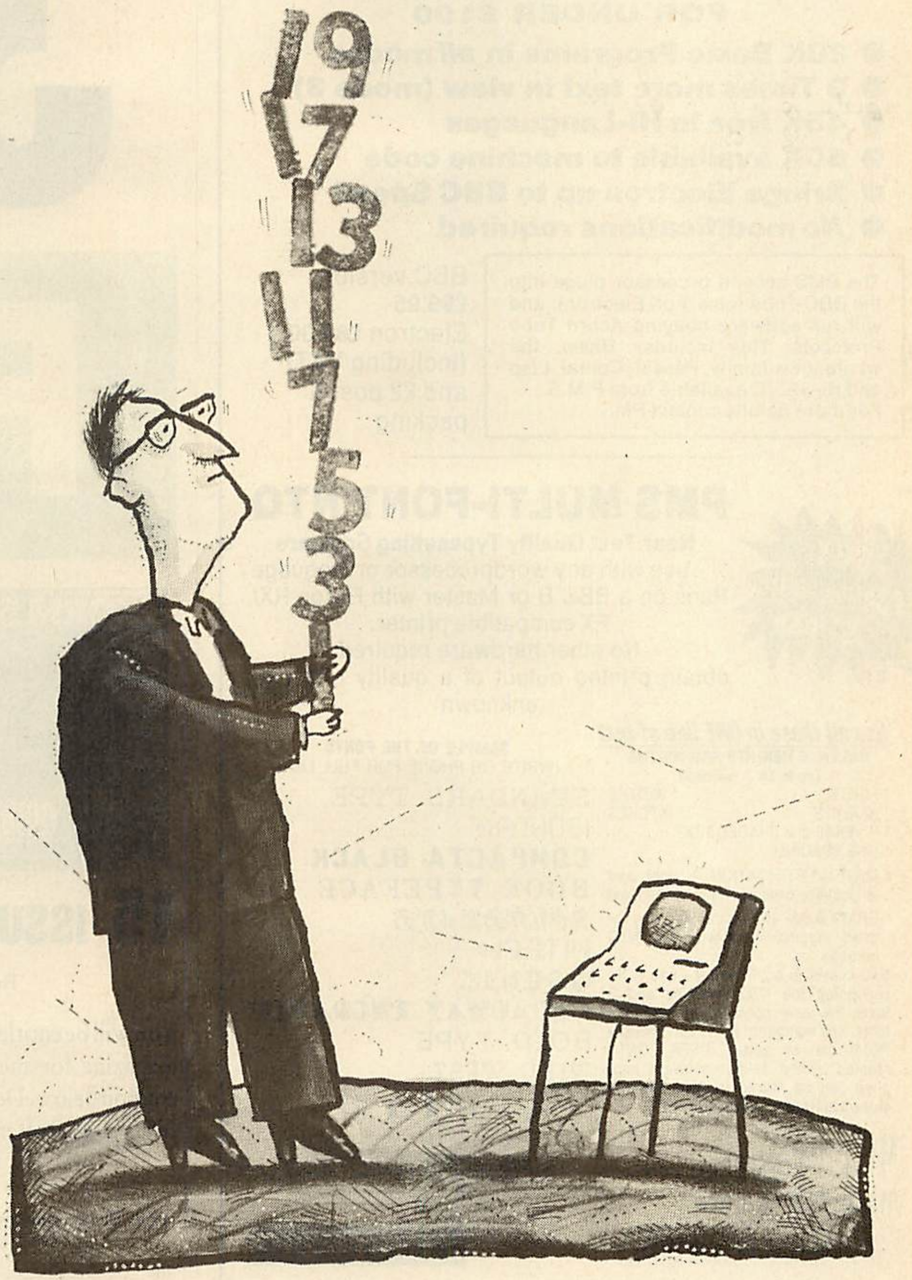
```
   10 REM Hints & Tips -
 listing 4
   20 REM By Martin Phil
lips
   30 REM for BBC B/B+/M
/E
   40 REM (c) Acorn User
 December 1986
   50 :
   60 J%=&2000:G%=J%
   70 !G%=2:P%=G%+4
   80 @%=8:T%=3
   90 REPEAT
  100 IF T% MOD !G%=0 G%
=J%:GOTO 140
  110 IF T%>!G%*!G% G%=G
%+4:GOTO 100
  120 PRINT T%;
  130 !P%=T%:G%=J%:P%=P%
+4
  140 T%=T%+2:UNTIL T%>9
9999
```

Listing 4. Prints prime numbers

prime number will be stored. T% is the number to be tested. To save time only odd numbers are tested.

Line 100 checks to see if the number can be divided by any of the prime numbers in the store and leave a remainder of zero. If it does, then the number cannot be prime and the program resets G% to the start of the prime number store ready to test the next prime number.

Line 110 checks to see that T% is greater than the square of the current prime number being tested. Once the number is less than the square of the highest prime number there is little point in testing with the higher prime numbers. If T% is greater than the square of the prime number under test then T% is tested against the next prime number. If not, then T% must be a prime number, and T% is printed out and stored in memory. The pointer P% is then moved forward four positions to point to the next free memory location. It will end when T% is greater than 99999. It is possible to go higher than this, of course, if one is prepared to wait. Extending the limit will eventually mean that the computer will run out of room.



I checked the first few prime numbers, but have by no means checked them all. On a BBC micro with cassette or an Electron, Master or Master Compact, J% can be set to &1000, and this would give a greater memory store before the memory runs out. It would also be better to increase @% to 10 if the limits given in listing 4 are extended.

If you want to get your brains and micros working away with numbers, turn to the challenging competition on page 105.

£5

PRINTING FRACTIONS

A useful hint has been sent in from Philip Hawthorne from Portadown in Ireland which wins him £5.

The following method can be used to print fractions on Epson-compatible printers using *Wordwise* or *Wordwise +*. The method is as follows:

1. Select superscript mode:

   F1 OC27,83,0 **F2**

2. Print the numerator eg, three
3. Print a backspace and select subscript mode:

   F1 OC8,27,83,1 **F2**

4. Print the denominator eg, four

5. Cancel the subscript mode:
F1 OC27,84 F2
6. This would print ¾ using the following string:
F1 OC27,83,0 F2 3 F1 OC8,27,83,1 F2 4 F1 OC27,84 F2
It is better not to put the line in between the numerator and the denominator, because it can obliterate part of the number and make it very difficult to read. A half can be done in a similar way:
F1 OC27,83,0 F2 1 F1 OC8,27,83,1 F2 2 F1 OC27,84 F2
and a quarter:
F1 OC27,83,0 F2 1 F1 OC8,27,83,1 F2 4 F1 OC27,84 F2
Finally 9/12 can be done as follows:
F1 OC27,83,0 F2 9 F1 OC8,8,27,83,1 F2 12 F1 OC27,84 F2
Note that an extra space is needed before the nine, and an extra backspace must be included. If you really want to be clever, it is possible to print the nine directly between the one and two. This can be done on some printers using the proportional space command, or the horizontal tab command with a relative dot tab. These codes must be cancelled directly after use.

£5

MASTER SOLUTION

One of the most common reasons for programs not working on the Master micro is when user-defined characters are saved to tape or disc.

On the BBC micro and Electron the storage space for these characters is in page &C00. When these are then directly loaded into the memory they overwrite part of the Master's Econet workspace.

On the Master series the storage space for user defined characters has moved into sideways RAM. Unless Econet is being used, loading these definitions into the wrong area of memory does not cause too much of a problem except that the user defined characters are, of course, not defined. David Green from New Zealand has sent in what I think will become the standard procedure for converting programs to work on the Master, and wins himself £5 for the effort.

The solution is to create an array and retrieve the data in blocks of eight bytes, and then pass it directly into a VDU23 statement, see figure 2.

```
10 DIM ch(7)
20 x=OPENUP("CHAR")
30 FOR I%=128 TO 159
40 FOR J%=0 TO 7
50 ch(J%)=BGET#x
60 NEXT J%
70 VDU 23,I%,ch(0),ch(1),ch(2),ch(3),ch(4),ch(5),ch(6),ch(7)
80 NEXT I%
90 CLOSE#x
```

Figure 2. Creating an array

*FX PROBLEM

Mark de Weger writes from the Netherlands with an unusual problem. He was trying to write a program that allowed the user to print an ASCII/*Wordwise*/*View* text file in the background. The program worked by using events.

Now event handling routines should not use VDU commands to prevent upsetting the VDU queue. If you do not understand this, imagine that the computer was just carrying out a mode change to mode 7 with VDU22,7 and the event happened just after the VDU22 was executed. Suppose that the event handling routine made the computer execute a VDU2. Now the computer would think a VDU 22,2,7 command was issued and instead of changing to mode 7 and switching the printer on, it would enter mode 2 and make a beep.

Mark had to send characters to the printer, therefore he inserted characters into the printer buffer using *FX138,3,. . . Here the problem started. To see it, set up your printer and run the following program (figure 3):

```
10 VDU 2
20 FOR loop=1 TO 100
30 *FX 138,3,65
40 NEXT loop
50 VDU 3
```

Figure 3. The *FX problem

You would probably expect 100 letter As to be printed by the printer. But this is not the case, the printer doesn't do anything. However if you replace line 30 by:
30 VDU1,65
the As are printed as you would expect. The reason for this is probably that the BBC micro only sends a signal to the printer to empty the computer's printer buffer (and print it or store it in its own printer buffer) if a character enters the printer buffer, but only if this happens due to a VDU command, not due to a *FX138,3 call. This can be seen with the following, restore line 30 to the original and add or change the following lines:
20 FOR loop=1 TO 10
45 VDU1,13
and re-run the program. Hey presto! Ten As are printed. This tends to reinforce the idea that the printer buffer can only be emptied if a character enters the printer buffer due to a VDU command.

How can Mark insert characters into the printer buffer without using VDU commands, but so that the computer's printer buffer is emptied (and printed) correctly by the printer?

QUICKFIRE CORNER

- For nearly a year I have despaired at the lack of a tear bar on my printer. There is one, but as the tractor feed is beyond the tear bar it is of no use. That is until I found an easy way to use it.

To tear the continuous feed stationery off, first switch to friction feed. Then open the two tractor feed paper clamps and tear the paper off against the cutting edge. Then wind the paper on an inch or so and close the clamps. Lastly do not forget to switch back to tractor feed. Obvious isn't it?

- Can't remember how many parameters follow a VDU call? Serious problems can occur with too few parameters especially as no error messages are given. If in doubt add a few extra zeros at the end. VDU0 does nothing hence any extra noughts will simply be ignored.
- Nigel Balchin from Cambridge has pointed out a simplification that could be used with the screen dumps presented in September's *Acorn User*. That is, instead of using VDU1, to send the next byte to the printer only, *FX3,10 will direct all the output to the printer and not the screen. Using this does away with the initial VDU2 and all the VDU1s. It can be cancelled by using *FX3.
- When loading sideways ROM images into sideways RAM on the BBC B+ and Master using the *SR commands, it has always been necessary to press CTRL-Break after it has loaded. A welcome feature on the Compact is both *SRLOAD and *SRWRITE can be terminated with an 'I' parameter and the sideways RAM image will be inserted automatically.

FIRST BYTE

IT ALL ADDS UP

Assembly language workers need a firm grasp of addition and subtraction

Tessie Revivis

The most fundamental part of writing machine code is the ability to write code that will add and subtract numbers. When you begin to write even small programs, you will quite often want to access memory addresses. Now that is no great problem – we saw how to do this last month when we EORed 256 bytes of screen memory to alter its colour by using the X register to form an index which is added to a base address – like this:

LDA &4000, X

Here the contents of X are added to &4000 to give a final address. If X held &45 then the address from which the accumulator is loaded would be:

&4000+&45=&4045

But any 6502 register can only hold a number in the range zero to 255, so when X contains 255 and you add one, it wraps around and becomes zero again, and similarly, if X held zero and your program subtracted one, the contents would wrap back to 255. We need to add a unit of 256 (&100) to the address so that it becomes:

&4000+&100=&4100

and X can start again.

So how do we add two values together? The answer is the ADC instruction. There are two ways in which this can be used; the first is in immediate mode and the second in a non-immediate mode – we'll examine the former first.

In immediate mode, the two numbers added are the one in the accumulator and the one specified by the ADC command:

LDA #3 load accumulator with three
ADC #5 add five to it

On completion of the ADC instruction the result is deposited in the accumulator. Listing 1 is a short program to do the above addition – it deposits the result at &70 which is then peeked and printed.

Now enter listing 2 and run the program to see what happens.

The result is not 264 as expected but eight. Why? As the accumulator can only hold numbers in the range zero to 255 it would seem that the ADC instruction is rather limited in this respect. So how do we go about adding numbers that will give results greater than 255, the sum of 128 and 129 for instance? The simple answer is that we don't. First, remember that the computer is adding the binary representation of the two numbers. In binary 131 and 133 are respectively:

131 = 1000 0011
133 = 1000 0101

```
 10 REM Simple Addition
 20 DIM code% 20
 30 P%=code%
 40 [
 50 CLC
 60 LDA #3
 70 ADC #5
 80 STA &70
 90 RTS
100 ]:CALL code%
110 PRINT "Result is: ";?&70
```

Listing 1. Addition in immediate mode

```
 10 REM Simple Addition 2
 20 DIM code% 20
 30 P%=code%
 40 [
 50 CLC
 60 LDA #131
 70 ADC #133
 80 STA &70
 90 RTS
100 ]:CALL code%
110 PRINT "Result is: ";?&70
```

Listing 2. Shows an unexpected result

We can add these together and the rules for binary addition are as follows:

0 + 0 = 0
0 + 1 = 1
1 + 0 = 1
1 + 1 = 0 carry 1

The last rule may seem difficult to grasp but think how denary (base 10) addition works: take two numbers and add them together if the result is nine or less you jot down the result in the column below, if it is greater than nine, write the unit value in the right column and carry the tens into the next column. Binary addition is very much the same except that we are working only with zeros and ones.

Now apply the binary addition rules to add 131 and 133:

bit no. 7654 3210
131: 1000 0011
133: 1000 0101
+: (1) 0000 1000

Working from right to left we have:

bit 0: 1+1 = 0 carry 1
bit 1: 1+0+1 = 0 carry 1
bit 2: 0+1+1 = 0 carry 1
bit 3: 0+0+1 = 1
bit 4: 0+0 = 0
bit 5: 0+0 = 0
bit 6: 0+0 = 0
bit 7: 1+1 = 0 carry 1

The addition of bit seven results in a carry, but we have no further bits to take the carry to be added. What is provided is a store for the carry so that it can be tested – this store is called the carry bit. We can see that this bit does actually have an effect on the way an addition is performed. Because the carry bit can have one of two states, one or zero, we must clear it to zero before doing any addition, which was done in listing 1 in line 50. Change this to:

50 SEC

and re-run the program. The result printed is now not eight but nine, because we have set the carry flag. This illustrates an important point, the ADC instruction is an ADD with carry instruction – in other words it adds the two numbers, then adds the carry flag. It is for this reason the carry flag should be cleared prior to an addition.

	Accum +	value +	carry =	result
CLC	9	5	0	8
SEC	3	5	1	9

Table 1. Effects of the carry flag

So to get around the possible overflow of the carry flag we need to do a two byte addition; if there is a carry over from the first byte it will be added to the second byte by the next ADC instruction. But what if we don't want a second number to be added? We simply add nothing, to get the carry flag as listing 3 illustrates.

```
   10 REM Simple 2 byte addi
tion
   20 DIM code% 20
   30 P%=code%
   40 [
   50 CLC
   60 LDA #131
   70 ADC #133
   80 STA &70
   90 LDA #0
  100 ADC #0
  110 STA &71
  120 RTS
  130 ]:CALL code%
  140 PRINT "Result is: ";?&
70;
  150 IF ?&71=1 THEN PRINT "
 plus Carry"
```

Listing 3. Adding zero in a two byte process

Having examined how addition works it makes sense to look at subtraction. The command that carries out a subtraction is SBC, or Subtract with Carry. Before a subtraction is made the carry flag must be set with the SEC instruction. The following program subtracts three from seven.

```
  10 REM Simple subtraction
  20 DIM code% 20
  30 P%=code%
  40 [
  50 SEC
  60 LDA #7
  70 SBC #3
  80 STA &70
  90 RTS
 100 ]:CALL code%
 110 PRINT "Result is: ";?&70
```

Listing 4. Subtraction example

You may be wondering why the carry is set before a subtraction. To understand why, we need to know about a technique called twos complement.

In binary subtraction it is much easier to think of subtraction as being the addition of one positive number and one negative number, so four minus three becomes four plus (minus three). To add this negative number to a positive number we need to find a way of representing a negative in binary. A system called signed binary was introduced, where bit seven of the byte is used to denote the sign of the number – when clear it is for a positive number, when set it is for a negative number. For instance in signed binary the number:

0000 1111

would be 15, whereas:

1000 1111

would be minus 15.

However, this is not an entirely accurate way to represent negative numbers. To convert a number to a true negative value, we obtain its twos complement. This is done simply by inverting each bit and then adding one. To invert a bit, simply change its state; a one becomes a zero and vice versa.

To represent minus three in binary, first write the binary for three:

0000 0011

now invert each bit:

1111 1100

and then add one:

1111 1101

Thus the twos complement value of minus three is:

1111 1101.

We can now take three from four by adding minus three to four thus:

(4) 0000 0100
(−3) 1111 1101
add (1) 0000 0001

The result is one but with a carry at the end. The one is correct but the carry is making the result nonsense. So ignore it.

The reason we must first set the carry flag in any addition then is simply to gain the bit we need to add to the inverted bits. Of course we don't do this ourselves, but the 6502 chip does – so it inverts (or flips) the bits and pinches the one from the carry to obtain the twos complement value. At the end of it all the carry is still set and so everyone is satisfied. As in the ADC examples above you can try changing the SEC to CLC and see that the result is in fact one less than it should be.

The immediate mode of operation applies to both addition and subtraction, as does the non-immediate mode. Simply, this technique involves using memory contents as a source of reference. We could therefore add or subtract the contents of locations &70 and &71 together and store the result in &72 as listing 5 demonstrates.

```
   10 REM Non-immediate subt
raction
   20 DIM code% 20
   30 ?&70=10:?&71=7
   40 P%=code%
   50 [
   60 SEC
   70 LDA &70
   80 SBC &71
   90 STA &72
  100 RTS
  110 ]:CALL code%
  120 PRINT "Result is: ";?&
72
```

Listing 5. Non-immediate mode example

The following examples are limited to use of zero page addressing, in other words the data addresses are all stored in zero page – that is memory from &00 to &FF. We should only use memory from &70 to &8F inclusive for our needs. However, addition and subtraction can be performed using other addressing modes. Listing 5 can be altered to subtract two numbers held in main memory.

```
   10 REM Absolute subtract
ion
   20 MODE 6
   30 DIM code% 20
   40 num1=&2FFD:num2=&2FFE
   50 result=&2FFF
   60 ?num1=240:?num2=40
   70 P%=code%
   80 [
   90 SEC
  100 LDA num1
  110 SBC num2
  120 STA result
  130 RTS
  140 ]:CALL code%
  150 PRINT "Result is: ";?
result
```

Listing 6. Altering listing 5 for subtraction

We can also use indexed addressing. An index register, such as the X register, is used to access memory from a starting point. Listing 7 illustrates this.

```
   10 REM Absolute indexed
   20 MODE 6
   30 DIM code% 20
   40 num1=&2FFD:num2=&2FFE
   50 result=&2FFF : offset
=&10
   60 num1?offset=100
   70 num2?offset=55
   80 P%=code%
   90 [
  100 LDX #offset
  110 SEC
  120 LDA num1,X
  130 SBC num2,X
  140 STA result,X
  150 RTS
  160 ]:CALL code%
  170 PRINT "Result is: ";o
ffset?result
```

Listing 7. Accessing numbers offset bytes

Do practice this method of addition and subtraction of numbers and ensure you understand fully what is happening. It is probably one of the most fundamental actions in machine code.

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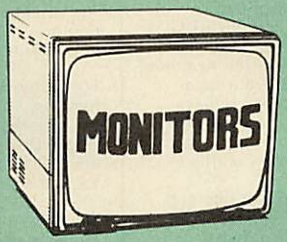
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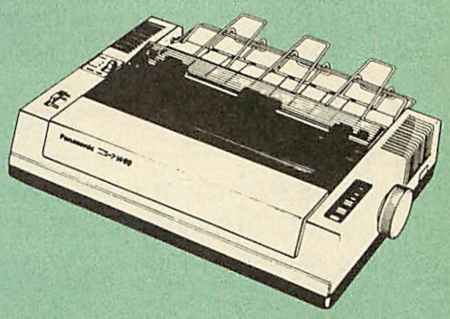
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In concluding, the reviewer writes "It must be said that Watford's DFS certainly offers a comprehensive range of facilities at a very attractive price". (Please write in for comprehensive details.)

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for three years, and has gained a large following amongst serious users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. (P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS).

PRICES

- *Complete Disc Interface Kit incl. DFS ROM & fitting instructions* **£58**
- *Acorn's 0.90 DFS Kit complete* **£52**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**
(P.S. Our comprehensive DFS Manual covers both Acorn & Watford DFSs)
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17** ● *ADFS ROM only* **£25**
- *Watford's DFS is exclusively available from Watford Electronics. Every ROM carries a special label with our LOGO and serial number.*

WATFORD's DOUBLE DENSITY DFS INTERFACE

The DDFS from Watford Electronics represents a new standard in DFSs for the BBC micro. This is a double density version of our popular single density DFS, and combines all the features of this powerful DFS with the advantages of a system that gives 80% more storage per disc in double density mode. P.S. – Please note that not all DDFSs are capable of providing either the full 80% storage increase, or of allowing a file the full size of the disc – Ours allows both of these! Operates both in Single & Double Density modes.

The typical piece of games software these days is provided upon a protected disc. In order to work on any double density system (including the others on the market) a protected piece of software needs to make calls through the OSWORD &7F routines. To ensure compatibility, the Watford DDFS features probably the most comprehensive and powerful 8271 emulation ever written for a double density system.

PRICES

- *Complete DDFS Kit incl. fitting instructions* **£46**
- *DDFS Manual* *(no VAT)* **£6.95**
- *We will exchange your existing Single Density DFS Kit for our DDFS Unit at* **£35**

CHRISTMAS GIFT VOUCHERS

Following numerous requests from you the customers, we have at last introduced our GIFT VOUCHER service. The Vouchers are available in £5; £10 & £15 demominations and are an ideal answer when faced with that problem of what to give for that special Birthday/Christmas gift. Simply send your credit card number or your cheque for the amount of Vouchers you require and we shall send you these attractive Vouchers. (There is a 50p handling charge on any amount.)

MYSTERIES OF DISC DRIVES & DFS REVEALED (BOOK)

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

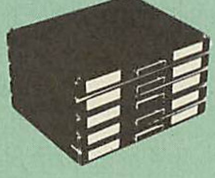
For instance, what is the difference between single and double density formats, how can you use a 40 track disc on an 80 track disc drive? What is the difference between a DFS and disc interface kit? Should you acquire a single Disc drive or twin? What does 48 TPI and 96 TPI discs mean? These are just a few of the questions you may have asked yourself and never found the answer or maybe you have yet to encounter these questions.

Now the mystery of buying a suitable interface and disc drive for your BBC micro is revealed in Watford's new book entitled 'MYSTERIES of DISC DRIVES & DFS REVEALED'. It describes in fine detail, yet remaining very readable to the beginner, how disc drives operate, the type of interfaces available, which type of discs to use on a disc drive and how data is stored on the discs.

£5.95 (Book No VAT)

DISC ALBUMS £4

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.



STAK-PAK

The unique computer program filing and storage system. Made of tough black plastic, these compact drawer sections hold two cassettes each and lock together vertically to form miniature cabinets of any height. Each drawer section has two C12 Data Cassettes with labels plus external index card.

Five twin Packs incl.
10 Cassettes Only: **£5**

FLOPPY HEAD CLEANER KIT

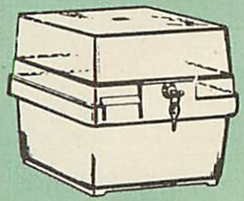
The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use.

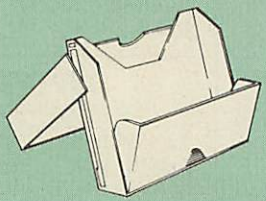
£8

LOCKABLE DISC STORAGE UNITS

Strong plastic case that afford real protection to your discs. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

- M35 - holds upto 50 discs **£8**
- M85 – holds upto 95 discs **£11**





PLASTIC LIBRARY CASES

FOR 5¼" DISC STORAGE holds 10 Discs. **£2.00**

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates the single density capacity. The double density storage capacity is second one, (that within the brackets). All disc Drive type numbers start with the prefix "C".

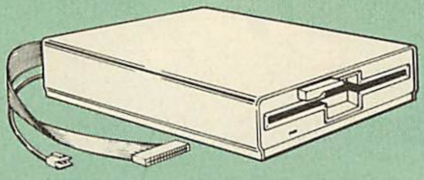
The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our drives are of Japanese manufacture. All our 80 track drives are already fitted with a 40-80 select switch.

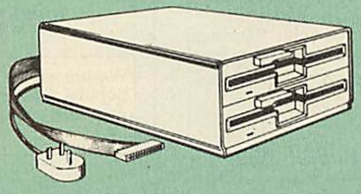
***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality JVC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate: extensive tests within our workshops have confirmed this. All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. (Ideal for Schools & Colleges. We are now able to supply all single disc drives in Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives; allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below for single drives is for a single drive in a standard single case. Single drive in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space; your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 10th page of our advert for the Plinths).
P.S. All our $5\frac{1}{4}$" Disc Drives are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.





Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £89		CS 200 £99	
400K (720K)	CLS400S £97	CLD 400 £165	CS 400S £110	CD400 £189
800K (1.44M)		CLD 800S £183		CD 800S £205

● TWIN Disc Drive Case, complete with Power Supply & Cables **£35**
Securicor carriage on Disc Drives £5 to £6

Prefix **C** = *Cased Drive*
L = *Less PSU*
S = *Single*
D = *Double*

Suffix **S** = *40/80 Switchable*

e.g. CLS400S = Cased drive, Less power supply unit, Single 400K, Switchable (40/80 track).

3M – DISKETTES

Top quality 3M – SCOTCH Diskettes from Watford Electronics (Your 3M Appointed Distributors). All our discs carry a lifetime warranty. These discs are quiet in operation and insert positively with their reinforced hub rings. Boxes of 10 supplied complete with self stick disc labels and write protect tabs.

- *10 × $5\frac{1}{4}$" S/S D/D 40 Track Diskettes* **£10**
- *10 × $5\frac{1}{4}$" D/S D/D 40 Track Diskettes* **£12**
- *10 × $5\frac{1}{4}$" S/S D/D 80 Track Diskettes* **£17**
- *10 × $5\frac{1}{4}$" D/S D/D 80 Track Diskettes* **£17**
- *Hi-Density 1.6M D/S D/D for IBM* **£32**

- *10 × $3\frac{1}{2}$" S/S D/D 40/80 track Discs* **£20**
- *10 × $3\frac{1}{2}$" D/D D/D 40/80 track Discs* **£27**

TOP QUALITY $5\frac{1}{4}$" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box to protect them from damage. We strongly recommend these Discs.

DON'T SETTLE FOR LESS, BUY THE BEST

- *10 ×* **M4** *S-S D/D 40 Track Discs* **£9**
- *10 ×* **M5** *D/S D/D 40 Track Discs* **£11**
- *10 ×* **M7** *D/S D/D 80 Track Discs* **£15**

- 3" *Double Sided Discs* **£4** *each*

Special BULK OFFER on $5\frac{1}{4}$" DISCS

(Supplied packed in plastic storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S/S 80T	D/S 80T
● Without Sleeves	£49	£74
● With Sleeves	£50	£75

ACORN WINCHESTER DRIVES

Suitable for direct connection, via the 1MHz bus, to any BBC running ADFS. These Acorn Winchester disc drives are fast and extremely reliable. Each Winchester comes complete with the Level III Econet File Server software.

10 Megabytes **£1050;** 30 Megabytes **£1549**

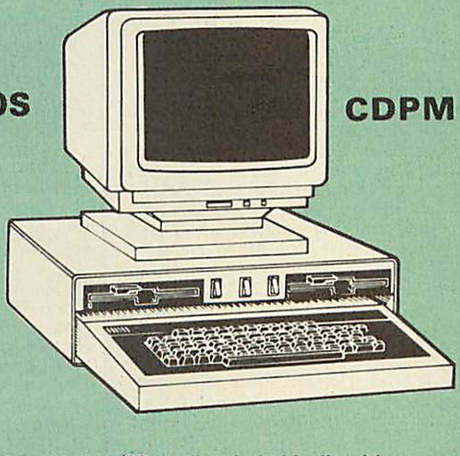
WATFORD's WINCHESTER DRIVES

- 20 Megabytes with ADFS **£635**
- 40 Megabytes with ADFS **£999**

WINCHESTER WORKSTATION

20 Megabyte Winchester, plus a Tape Streamer and a 400K Floppy Drive all housed in a plinth with cooling fan **£1499**

CDP 800S **CDPM 800S**

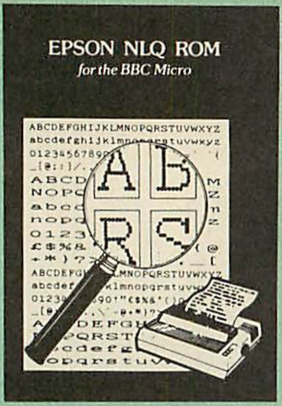


Twin 800K Double sided 40/80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £235

CDPM 800S for Master £245

(Securicor Carr. £7)



Harness the full potentials of your Epson RX & FX Printers. Impress your friends and business colleagues with the quality of your letters and printed material with Watford's very simple to use EPSON NLQ! (Near Letter Quality) ROM. Suitable for FX80, RX80, RX80F/T, FX100.

Look at the features:
- Simply type *NLQ80/100 and a single VDU code to use NLQ print.
- NLQ is then available without any modifications from BASIC, WORDWISE, VIEW (with NLQ DRIVER) or virtually any other program or language.
- Single codes select PROPORTIONAL type (yes even on the RX80); ENLARGED type; UNDERLINED type. These features can be used seperately or in any combination.
- Full UK character set; Standard 'pica size'; Proportional spacing; Enlarged; Underlined; Normal type.

The NLQ ROM is supplied complete with comprehensive manual.

P.S. NLQ ROM is compatible with the Torch Z80 system and can be used from within the Perfect Writer software.

Only: £25

VIEW PRINTER DRIVER for NLQ ROM

This specially written printer driver has been designed to allow View access to the full features of our NLQ ROM.
A must for all VIEW and NLQ ROM users.

£7.00
(Hi-View compatible)

THE NLQ DESIGNER

(The First & still the Best)

KAGA KP810/910 and Canon PW1080 are two superb printers, as our many thousands of satisfied customers would surely attest to. One of it's particularly strong points is the NLQ option that it offers; perhaps one of the more weaker points is the effort required to design your own custom NLQ font.

Well the solution is here NOW in the shape of Watford's NLQ DESIGNER ROM! For the BBC Micro. This powerful piece of software allows easy design and entry of a full NLQ font, with further fonts recallable from disc. Once a font has been programmed with the versatile NLQ DESIGNER, it can be saved to disc, downloaded to your Kaga (or Canon) printer, or even programmed into an EPROM (given the appropriate hardware) and then plugged directly into your printer so that it is available immediately when you turn it on. Downloadable Fonts require 6264 RAM chip fitted. Now BBC Master compatible.

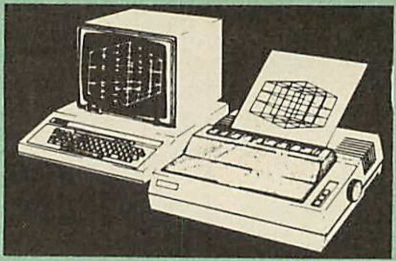
A 40 or 80 track (please specify) FONT Disc containing 9 Fonts, (Italic, Courier, Courier Italic, Script, Copper Plate, Shadow, Bold, Double Print, Gothic and Greek is now supplied FREE with every package.

(P.S. This ROM is not suitable for Epson printers.)

- NLQ Designer ROM & FONT Disc **£25**
- Kaga Individual FONT ROMs **£15**

(Write in for further details).

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including all Mode 7 facilities etc. We have to admit that there is one facility that we cannot replicate – if anyone can supply flashing ink we would like to know!
The ROM also provides window setting utilities and two new OSWORD calls that allow mode 7 graphics pixels to be read and plotted using the standard graphic co-ordinate system. The latest version includes a graphic dump trigger for dumping screens from games whilst they are running.
Two commands are used to operate the dump routines:
*GIMAGE – This provides a full graphics dump of any graphics mode, plus modes 7 and '8'. There are many optional parameters but you need only specify the parameters you wish to change.

Features available include:
- Vertical and horizontal scaling through all the graphic modes and mode 7
- Rotation of the image produced through 90, 180 and 270 degrees
- Left hand indentation setting
- Screen dump window definition
- Colour grey scaling
- Two tone fast dump
- Special colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered dumps
- User port switched dumps

What does the independent press say!

Practical Electronics, May 1985
"The Dump Out 3 ROM from Watford Electronics represents one of the most sophisticated types of printer dump utilities available for the BBC Micro . . .".

"an extremely sophisticated and powerful dump utility".

"VERDICT – Dump Out 3 ROM has all the facilities which you are ever likely to need for producing printer dumps. The facilities available work extremely well and if printer dumps are something which you require, then this ROM can be recommended to help you to get the best out of your dot matrix printer".

The Micro User Feb. 1985.
"Well, here is that winner"!

"provide(s) some rather sophisticated screen dumps. Producing high resolution paper copies of graphic screens in any (graphics) mode will be the major reason for buying this ROM, and this is where Dump Out 3 performs PAR EXCELLENCE". (Our capitals for their italics.)

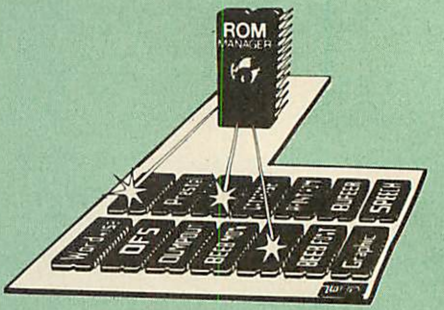
"The versatility of *GIMAGE (the graphics dump command) when using these parameters is amazing. Pictures of almost any size, shape, contrast or distortion may be produced without the need for a reducing photocopier or trick photography".

"Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC micro. It is easy to use yet highly versatile, and caters for all BBC screen modes in multitone high resolution printing. Whole, partial, rotated and scaled screens may be dumped to almost any BBC compatible dot matrix printer (see our list at the end of this advert). At £25 it must represent excellent value for money and surely cannot be beaten".

Designed for use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Mannesman Tally etc.
Price including comprehensive manual

£25

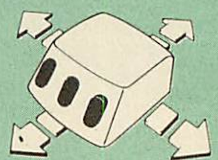
ROM MANAGER



Probably the most powerful way of expanding the BBC micro is from the use of Sideways ROMs. One problem faced by the avid ROM collector is that of ROM command clashes. The solution is very simple in the form of the ROM that "Provides comprehensive management of all your installed ROMs". (Quote from BEEBUG November '84.)
Basically, ROM Manager offers you the ability to turn off any installed ROM, or to send any * command to any specific installed ROM. It is said that imitation is the sincerest form of flattery – Acorn's BBC Plus features many of the abilities of this powerful ROM.
Many more facilities available.

SPECIAL OFFER £18

THE AMX MOUSE



Now supplied with the NEW SUPERART Software ROM & Disc at no extra cost.

ONLY: £65 (carr £1.50)

We are giving away, absolutely **FREE,** our popular Colour Art software package worth **£15** with every AMX Mouse package purchased from us.

AMX DESK Package	**£19.00**
AMX UTILITY Package	**£11.00**
AMX SUPERART Package	**£42**
AMX PAGE-MAKER Pack Best desk-top publishing software. Works with keyboard, joystick and AMX Mouse	**£39**
AMX 3D ZICON Disc	**£20**
AMX Database Disc	**£20**
AMX XAM Educational	**£20**
AMX MAX: A gem of desktop (ROM)	**£17**

RB2 MARCONI TRACKER BALL

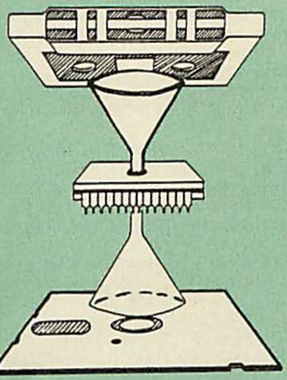
This popular unit is supplied complete with software. Price: **£50**

FLEET STREET EDITOR

Software pack **£35**

TRANSFEROM

(Tape to Disc Utility)



Not compatible with 1770 DFS.

This advanced and sophisticated utility ROM for the BBC Micro has the following features:

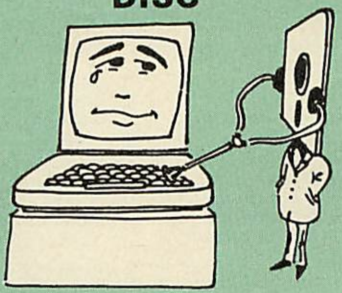
- Fully menu driven for ease of use
- Copes with locked programs
- A very comprehensive built in copying features
- Copies very long adventure games
- Supplied with comprehensive manual

TRANSFEROM is now available in BOTH single and double density versions. The single density version works with both the Acorn and Watford single density DFSs. The double density version works with the Watford DDFS system only.

TRANSFEROM takes your software on tape and saves them onto disc. TRANSFEROM does not stop when one disc is full; you just insert another disc in and carry on with that one! Surely this is the most valuable investment you could make if you have tape software that you wish to transfer to disc! Please specify version required – Single or Double Density.

£25.00

DIAGNOSTICS DISC



The BBC micro is a very complex machine and thus diagnosing a fault can be very difficult. Until now, the only way to discover the nature of a fault was either to find a competent friend with a large degree of patience or to find your nearest dealer and pay him to find out what is wrong.

At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.

The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:

RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.

This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

NEW LAUNCH

THE BBC PLUS ROM BOARD

Specially designed for all BBC Plus users, this board sits in an external box, and will accept either 10 off 16k EPROMs, OR 10 off 32k EPROMs.

With the 32k EPROMs, only 5 can be 'online' at once (that's all the B+ can address, as each chip 'holds' two normal sockets worth), but you can swap between the two banks if necessary. With the 16k EPROMs, you can obviously address them all at once. An extra card can be added to permit 2 banks of 10 EPROMs to be used (again with only one bank available at once).

The ROM box, which has its own mains power supply, and connects to the BBC Plus via a specially designed card (which is a buffered card for your peace of mind) permits easy access to the EPROMs via the hinged lid. NO soldering is required for this board.

ROMAS

THE CROSS ASSEMBLER AND MACRO EDITOR FOR SERIOUS PROGRAMMERS!

ROMAS is a carefully designed, sophisticated yet simple to use, development system for serious assembly language programmers. Using the BBC as the development system, you can choose your target system from the following processors:

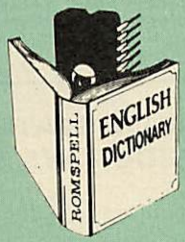
6502, 65C02, Z80, 8085, 8041, 6809 and Z8 P.S. This includes the Acorn 6502 & Z80.

A give away at . . . **Only £29**

Please specify 40 or 80 track disc when ordering.

ROM-SPELL

"way ahead of any competition"



ROM-SPELL is probably THE most advanced and fastest spelling checker available for the BBC Micro. Printed below are some extracts from a recent independent review (A&B Computing Nov. '85), which we feel sure will convince you that this is THE only spelling checker worth considering.

"The editing system is very neat and simple, instead of replying to queries and beeps all of the time . . ."

"The other feature which places ROM-SPELL way in front of any competition is the ability to examine the user dictionary, so any spelling mistakes that have found themselves on the disc can be examined and taken out if necessary".

". . . that it is compatible with many of the popular word processors on the market is a good indication that ROM-SPELL is going to be a very popular product indeed".

". . . ROM-SPELL is by far the best spelling checker for the unexpanded BBC B (with or without word processor). It boasts features which are hard to find on conventional spellcheckers on CP/M and MSDOS, namely Spellstar and has a speed/performance ratio of roughly the same as its CP/M cousin. The difference is that the CP/M version would cost the best part of £500".

". . . and with such vital house keeping features as an ambiguous word checker, the ability to edit the user dictionary, a comprehensive manual that is both easy to read and actually ENJOYABLE to learn from, . . . I feel confident that ROM-SPELL will woo the word processing public with no problems at all".

Compatible with: View, Wordwise & Wordwise +.

Don't settle for less, Buy the best.

£25

(Not compatible with 1770 DFS)
(Please state 40 or 80 track disc)

BBC MICRO BUSINESS/ WORD-PROCESSING PACKAGE

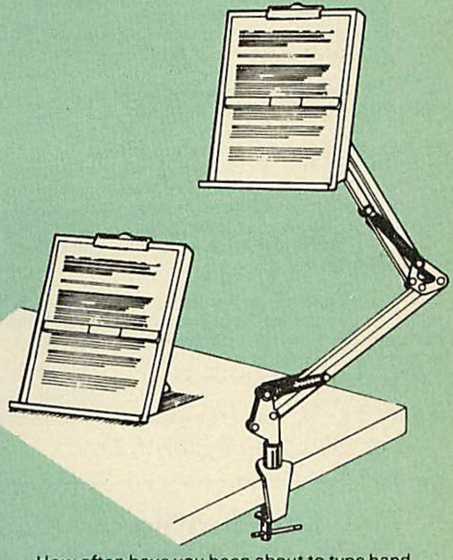
A complete word-processing package (which can be heavily modified to your requirements, maintaining the large discount). We supply everything you need to get a BBC micro running as a word-processor. Please call in at our retail shop to discuss your particular requirement and a demonstration.

EXAMPLE PACKAGE

BBC Master 128K Micro, View wordprocessor, Viewsheet, Basic Editor, Terminal Emulator, Twin 800K 40/80 track double sided Disc Drives, Zenith Hi-Res green monitor, Brother HR15XL professional quality Daisy Wheel printer, Gemini Database, Spreadsheet, Beebplot Graphics, Cashbook, Final Accounts, Mailist, Easiledger, Invoice & Statements, and Stock Control packages on disc with manuals.

Only £949

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.

Available in desk resting and shelf clamping versions, these two units hold your paper firmly by means of a magnetic ruler and a clip grip.

Mounting to a convenient flat surface, the two joint anglepoise Manuscript Holder allows the paper to be positioned at virtually any convenient angle whilst only taking up a fraction of the surface area that the paper being held does.

The smaller desk resting Manuscript Holder is useful for the more organised desk where the problem is simply holding the paper at the right angle.

Whatever desk arrangement you use, surely you deserve a Watford Manuscript Holder!

Amazing value at only
Desk Top **£10** (carr. £2)
Angle poise **£14** *(carr. £3)*

All prices in this advert are exclusive of VAT.

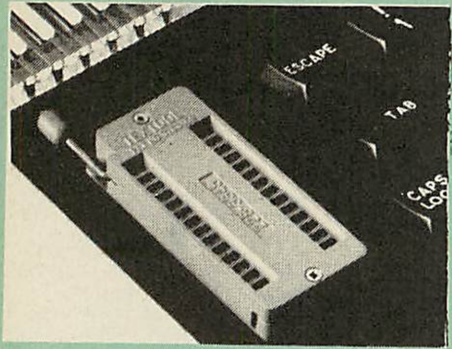
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

Continued →

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must foı all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£15** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack.

Complete System	**£12**
Spare Cartridges	**£2.50**
Spare Rack	**£1.50**

16K Sideways RAM Modules

This is it! The revolutionary design RAM Module you've been waiting for. Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional extras

READ and WRITE protect Switches **£2** each
Battery for Battery Backup **£3**



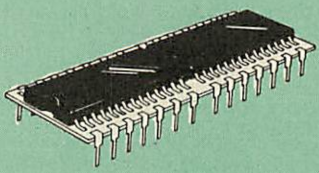
This is the RAM you've been waiting for!! This battery backed up, write protectable 16K sideways RAM board allows you to run from disk every sideways ROM available. Beware of other sideways RAM boards which are not backed up as certain ROMs will not run in these boards even though the RAM can be write protected. The Battery Backup facility allows retention of DATA after power off. On switch on the Micro will think the WATFORD DISC RAM is a ROM. Features available are:

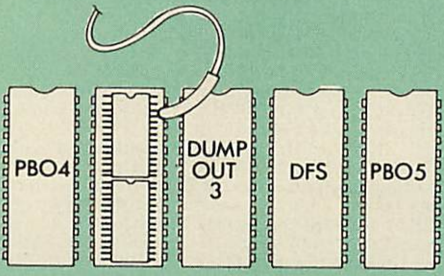
- No soldering or modifications to BBC micro necessary.
- Plugs into normal ROM socket fitting neatly under the keyboard allowing room for other add-ons.
- Easy to use. Comes with disk based software to SAVE and LOAD ROMs. Allows you to make backup copies of your ROMs.
- Disk software can be copied onto other discs when disc is full.
- No messy plugging and unplugging of your ROMs. Simply Load the one you want into DISC RAM.
- Ideal for Professional users to develop ROMs. Backup facility allows testing of final versions without using EPROMs.
- The switch provided allows backup and write protection to be switched off externally.
- Can also be used as 16K printer buffer RAM in conjunction with our Buffer & Backup ROM.

New Low Price: £32 (carr £2)

P.S. 16K DISC RAM Board is not designed to work in conjunction with a Sideways ROM Board.

SOLID STATE 16K SIDEWAYS RAM





This new unit from Watford, which utilises the latest in Static RAM technology, offers 16k of easy-fit sideways RAM in a very compact unit with a footprint no larger than a standard 28pin EPROM. With only a single flying lead terminating in a mini hook-on probe, to fit, (no soldering required) this compact unit works with any BBC Micro with or without a ROM board. ***Compatible with BBC B Plus.*** Like our other 16K RAM Modules, this unit is very simple to fit.

Only **£28** (carr 2)

Supplied complete with comprehensive software on Disc, Operating and fitting instructions.

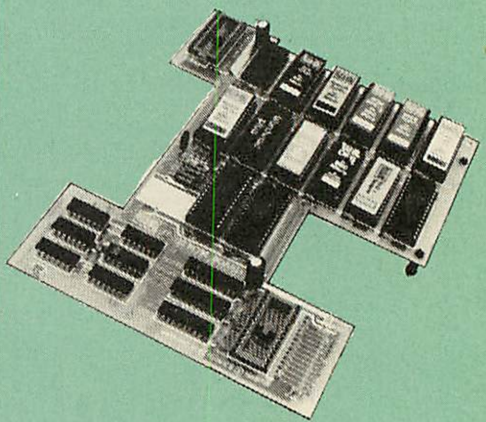
Do you find the 16K Sideways RAM Units confusing? If so, we have compiled this quick questionnaire to help YOU decide which is the best one for you. If the answer to any of the questions is yes, then use the index number to select from the boards below. Options in brackets indicate possible secondary choices.

Do you require:

- Sideways RAM for a BBC B? Choose 1, 2 or 3.
- Sideways RAM for the B+? Choose 3.
- A small, basic module? Choose 3.
- A sideways RAM module for a ROM board? Choose 1 or 3.
- An easy to use utilities disc? Choose 1, 2 or 3.
- More than one module installed at once? Choose 1 or 3.
- To use sideways RAM as a printer buffer? Choose 1 or 3.
- Battery Backup? Choose (1) or 2.
- Write protect for RAM (makes ROM look like RAM)? Choose (1) or 2.
- Read protect (allows recovery from crashes)? Choose 1.

Key:
1) 16k Sideways RAM Module
2) 16k Disc RAM
3) Solid State 16k Sideways RAM

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

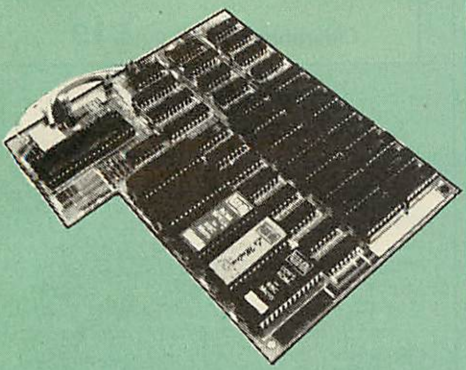
Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish"; allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £34
Battery backup fitted **£36**
(carriage £2)

Watford ROM/RAM CARD

A must for all serious users



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM/RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM/RAM Board.

The ROM/RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- *ROM/RAM card with 32k dynamic RAM **£43***
- *ROM/RAM card with 64k dynamic RAM **£59***
- *ROM/RAM card with a massive 128k dynamic RAM **£89***

(carriage on ROM/RAM Card £3)

OPTIONAL EXTRAS:

- *16k plug-in Static RAM kit **£6***
- *16k Dynamic RAM for Upgrade **£7.50***
- *Battery backup **£3***
- *Read and Write protect switches .... **£2** each*

*Complete ROM/RAM board (all options installed) **£99***

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World/wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELESOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple *COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON/OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- *FREE 3 months subscription to MicroLink.*

- *BT Approval applied for.*

SPECIAL OFFER

Price: **£79**
(carr £3)

PROHIBITED from direct or indirect connection to any telecommunication system run by British Telecommunications. Action may be taken against anyone so connecting this apparatus.

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Nightingale Modem

SPECIAL PRICE to our Customers

£99
(carr £3)

(Price includes: Nightingale Modem, Commstar ROM pack, Cables & Comprehensive manual)

Nightingale Modem without software	**Only £87**
COMMSTAR ROM package only (P&P on modem £2.00)	**£29**
Auto Dial/Auto Answer Board (non BABT)	**£48**
Auto Dial Utilities Disc	**£9.50**
OBBS Bulletin Software	**£20.00**

APOLLO

The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost – High Performance modem with Auto Dial & Auto Answer facilities as standard; we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200/1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Special Launch Price: **£75**
(Carr £3)
(Write in for full specification)

BT TELEPHONE CONNECTORS

LJU	1/4A Mini Line Master	**£4.50**
LJU	1/6A Mini Line Slave	**£3.00**
LJU	2/4A Line Master	**£4.00**
LJU	2/6A Line Slave	**£2.50**
LJU	3/4A Flush Master	**£3.95**
LJU	3/6A Flush Slave	**£2.75**
LJU	10/3A Dual Splitter	**£5.50**
	4 Way BT Plug	**£0.75**

Versatile BEEB SPEECH SYNTHESISER Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£48
CARETAKER Basic Utility	£27
Graphics ROM	£23
Disc Doctor ROM	£24
TERMI	£27
COMMUNICATOR	£49
SPEECH ROM	£26
Printmaster	£24

Wordwise £25

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text/segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS

Supplied on disc. This version requires a WORDWISE-PLUS ROM to be present in the machine. It gives up to 44k of text space on the 6502 2nd processor.

£5

Inter SHEET **£40**

INTER CHART **ONLY: £26**

Inter-WORD

Only: £46

Special Discount price for the existing Wordwise Plus owners. Simply quote your reg. number and pay.

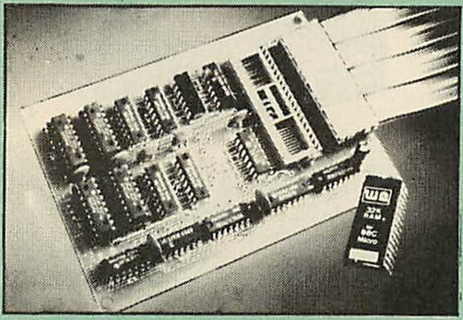
Only: **£39**

All Prices Exclusive of VAT

32K

SHADOW RAM-Printer Buffer

Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B+ or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.
- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Ensure COMPATIBILITY with a vast range of hardware (including our ROM board, the ATPL ROM boards, double density boards, second processors), and software (including BASIC, TOOLKIT, VIEW, WORDWISE (1.20+), WORDWISE-PLUS, Music 500's AMPLE). This is because our board, unlike those of our competitors, is connected to the computer by a ribbon cable and has the power consumption of a couple of ROMs!'
- Achieve EASY OPERATION with ROM based software. A large range of commands is available for machine code and BASIC users, including some useful *HELP messages, and a comprehensive manual is supplied free.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only: £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

SPECIAL OFFER
Acorn's Speech Synthesiser
Package

Complete with manual in its original packaging

Clearance price Only: **£19**

INCREDIBLE WORD PROCESSING DEAL ! ! !

Watford Electronics, already renowned for quality products at discount prices, are offering, the truly spectacular BARGAIN OF THE YEAR!

A Watford's 32K Shadow RAM Card – Printer Buffer and the much sought after, Computer Concepts' Inter-WORD, (a very powerful package) All this at an astounding price of:

Only £79 (carr £2)

DATAGEM

Gemini's popular Database package

Only: £34

VIEW

VIEW WORDPROCESSOR 2.1 .... **£37**

VIEW 3.0 ROM

Price: Only **£56**

HI-VIEW

A special version of VIEW designed for use with 6502 2nd Processor. Available on disc, it offers 47K of text memory.

£36

VIEWSHEET (Acornsoft)	**£37**
VIEWSTORE	**£37**
VIEWSPELL with 80 track disc	**£29**
VIEWPLOT Disc	**£22**
VIEW-INDEX	**£14**

Watford's own Sophisticated VIEW PRINTER DRIVER for Epson FX80 & KAGA KP

Only £10

VIEW DRIVERS FOR JUKI & BROTHER HR15 PRINTERS

Only £10

VIEW/VIEW SHEET PRINTER DRIVER for SILVER REED

(Officially approved by Silver Reed)

Only: £10

MINI OFFICE II (tape) **£14.50**

ARIES CORNER

Aries B-32
Shadow RAM Card

18 months of intensive research and development have produced a worthy successor to the widely acclaimed Aries-B20; the revolutionary Aries-B32. This 'second generation' expansion board features 32k of RAM and a 16k ROM socket.

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus and many othr applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

Price: B-32 **£80** (carr. £2)

Aries B-12
Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries B-20 and the Aries B-32. For the business user or educationalist, the compact and secure internal fitting is ideal, with the ROM board tucked neatly inside the lid where it will not cause overheating problems. The serious software developer and the hobbyist may prefer to mount the board externally, giving instant access to the sockets for experimental purposes. A zero-insertion force (ZIF) socket may be fitted to the board to enhance this mode of operation.

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable 'mother board' which carries the extension ROM sockets and a small 'base board' on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have an B32 or B20, a small adaptor module (the Aries B-12C) is available at a nominal cost. The 6264 static RAM chips used to provide the sideways RAM are advertised elsewhere in our advert.

Price:
Aries B-12 **£40.** Aries B-12C **£5**

GRAPH PAD 2

Supplied complete with Software
£60 (Carr. £3)

ARIES B-488
IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

Aries B-488 Unit: **£238** (Carr £3)

THE ARIES RANGE HARDWARE REQUIREMENTS

Aries B-32 – BBC B, MOS 1.20, hardware plugs into CPU socket.
Aries B-12 – BBC B, MOS 1.20, hardware plugs into all four sideways ROM sockets and connects to the B32 or the B20. The adaptor Aries B-12C module is necessary where these are not fitted.
Aries B-488 BBC B, MOS 1.20, Hardware plugs into 1MHz Bus.

BEEBMON

The most powerful machine code monitor for the BBC Micro **£24.**

DISASSEMBLER ROM

ONLY **£16**

THE INVESTIGATOR

This sophisticated Utility program on disc, enables you to make security back-up copies of most of your valuable Disc Software. Makes full use of all 8271 (will not run with double density DFSs) facilities to discover the precise format of your protected disc so that an exact copy can be produced. Supplied with detailed instructions. Please specify 40 or 80 track disc when ordering.

Only **£20**

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234/33383

النور

ARABIC ROM
for the BBC Micro

The ALNOOR ARABIC ROM converts your BBC into a bilingual computer. New keytops provide both English and Arabic symbols. Two sets of Arabic symbols are provided for use in either context sensitive or insensitive operation.

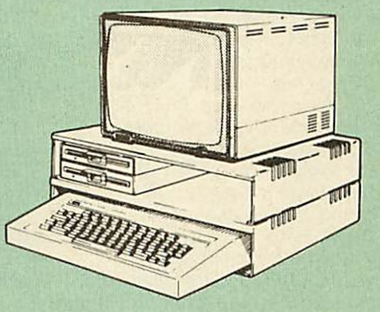
20, 40 and 80 column operation. Compatible with ASMO (449). English/Arabic printer interface software. Numeric entry from either left or right of number. Communications software to send or receive 7 or 8 bit data.

Different shapes of Vowels (e.g. Shadda, Fatha, etc). Different shapes of Hamza. Full English and Arabic character sets with all special characters.

£85

(Price includes Alnoor ROM, Operating Manuals & a full set of Arabic/English Keytops)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£20** (carr. £2.00)
PRINTER PLINTH	**£10** (carr. £1.50)
SINGLE MASTER PLINTH	**£14** (carr £1.50)
DOUBLE MASTER PLINTH	**£25** (carr £2.00)

OFFICE MATE

The popular Database, Spreadsheet, Beebplot and Wordprocessor on Disc
£10

OFFICE MASTER

The popular Cashbook, Final Accounts, Mailist, Easiledger, Invoice & Statements and Stock Control
£21

Money Management

This disc based software allows individual transactions to be stored and retrieved for upto 5 Bank a/c and 5 Loan accounts.

Price: Only **£11**

L.B.O. Rom
Life & Business Organiser

Use LBO to organise your life from today until 1999! It can handle literally hundreds of multi-line messages, as many as you are ever likely to need. Despite the very wide range of facilities offered, this professional program is VERY easy to use and requires absolutely NO knowledge of computers. A vital aid to your everyday life, LBO is GREAT FUN TO USE!

Price only: £17

D D D Suite
Integrated Software System

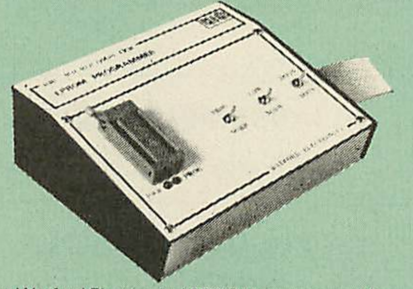
-BASE **£12**
-CALC **£12**
-PLOT **£12**
COMBO PACK All 3 together **£26**

Continued ⟶

BOOKS (No VAT on Books)

30 Hour BASIC (BBC Micro)	£7.95
40 Best machine Code Routines	£7.95
6502 Assembly Language Program	£19.95
6502 Application	£11.95
6502 Assembly Lang. Subroutines	£19.95
6502 Development System	£7.50
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SOFTWARE PACKAGE
The software is supplied on an EPROM which plugs into the Micro and is instantly available with a single command (no time wasting as on Cassette/disc loading). It is a fully purpose designed and ingegrated package to simplify ROM development. The system is menu driven with many prompts to avoid any accidents.

Software facilities include:
Load File – Save File – Down Load EPROM – Program EPROM – Verify – Blank Check – Editing of memory contents prior to programming.
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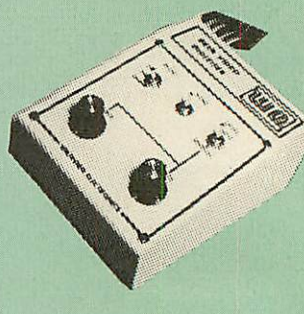
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This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

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Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROM's to work on it.

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Gemini Marketing Ltd, Exmouth, Devon

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Microman Computers, Rainford Industrial Estate, Mill Lane, Rainford, St. Helens

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Verospeed Ltd, Boyatt Wood, Eastleigh, Hants.

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Alpha Computer Co, Shop 314 Chi Fu Commercial Centre, Chi Fu Fa Yuen, Hong Kong. Tel: 5-506592.

Computer Distribution Company, Parklaan, 47, B09300 Aalst, Belgium.

Lendac Data Systems, Unit 31, IDA Enterprise Centre, Pearce Street, Dublin 12. Tel: 710796.

Scientex P.V.B.S., Zilversmidstraat 2, B-2000 Antwerpen, Belgium. Tel: 03 233 59 06

Techno-matic Data, Holbergsgade 19, 1057 Kobenhavn K, Denmark

Velobyte, Scheaedyksadyk 5a-6a, 3011 EB Rotterdam, Holland. Tel: (010) 413 8197/414 5171.

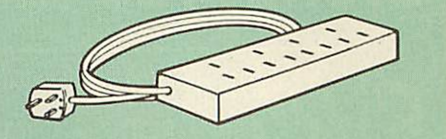
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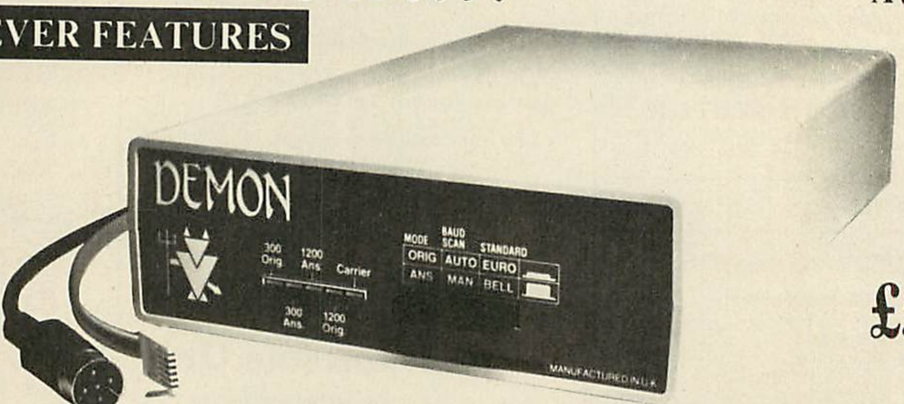
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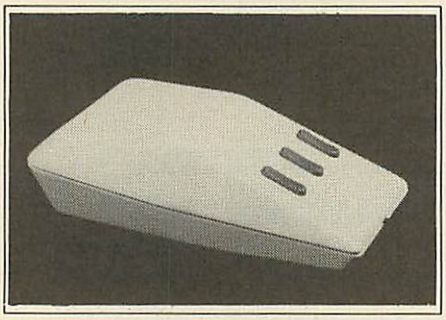
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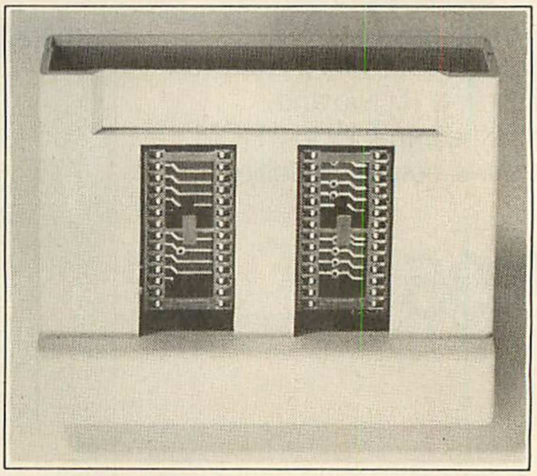


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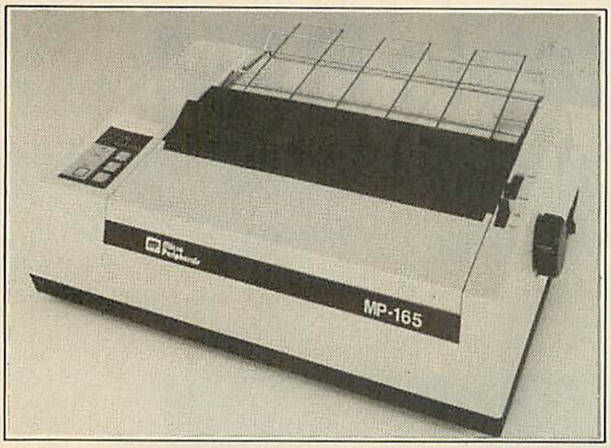
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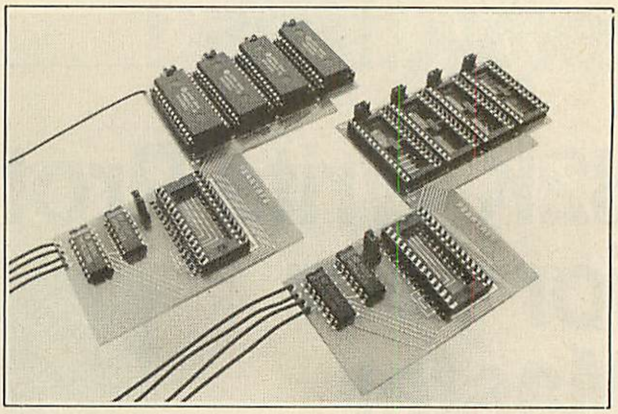


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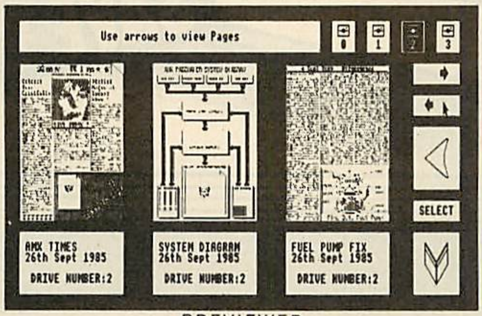
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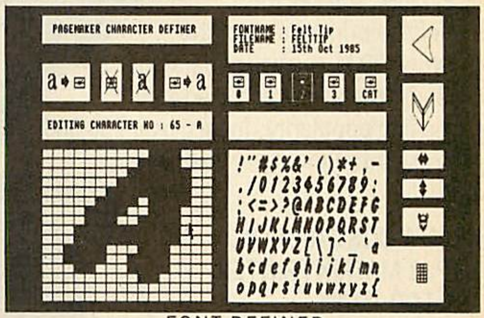
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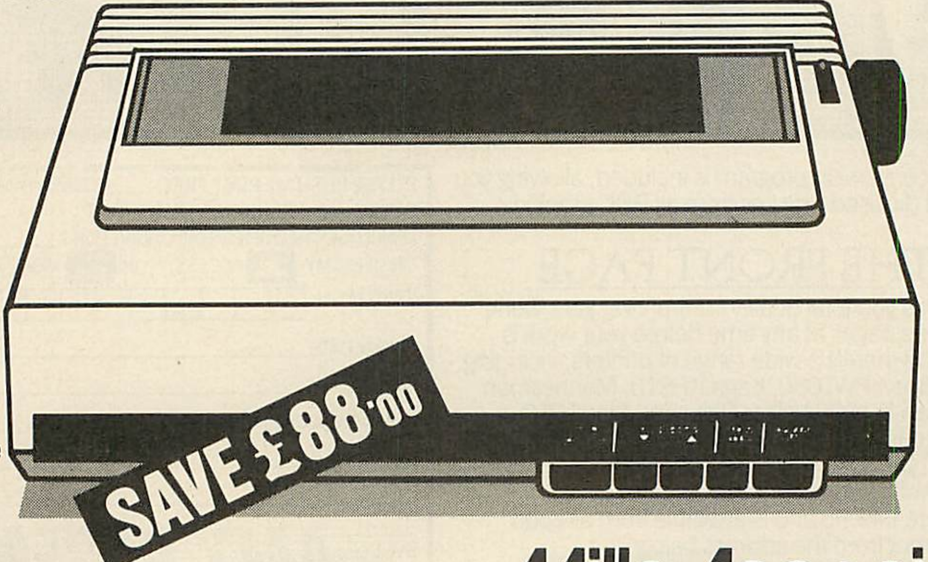
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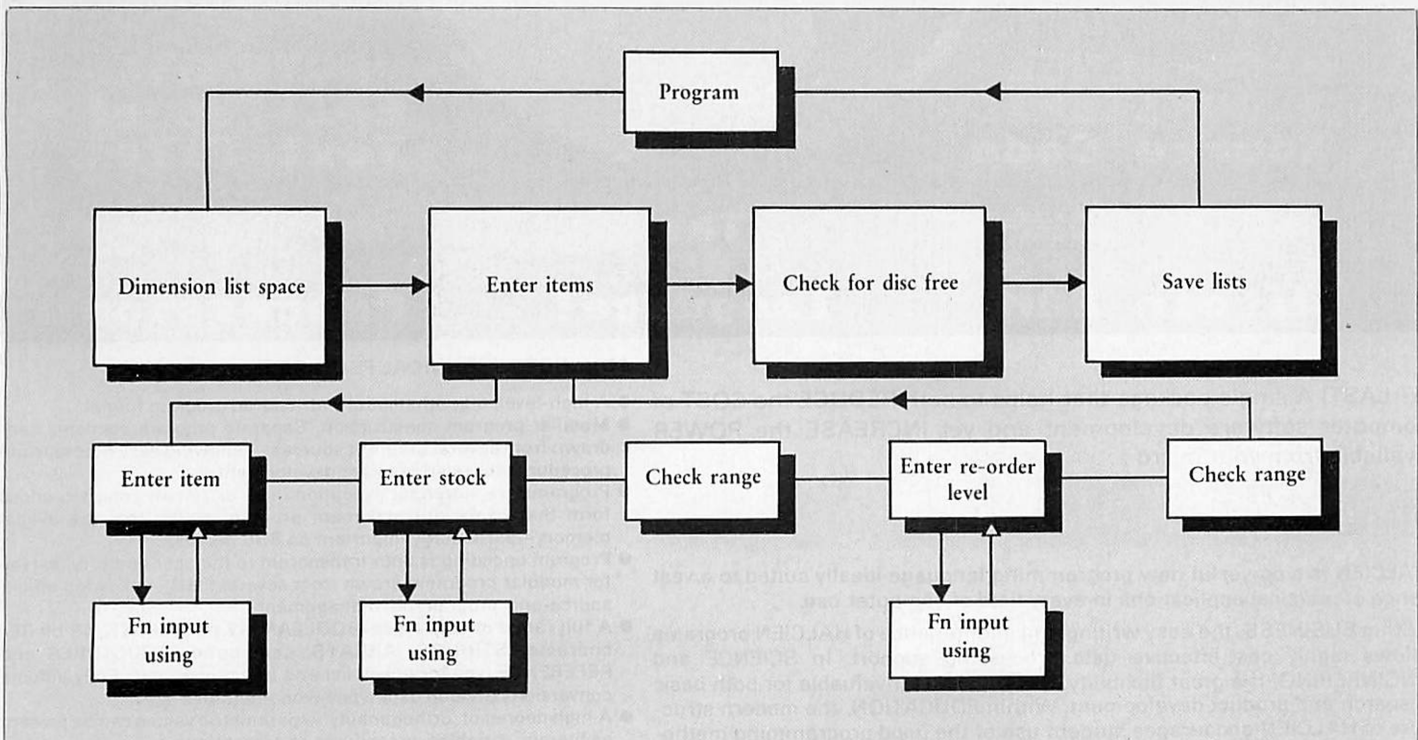


Figure 1a. A structure diagram to illustrate how the main parts of a program tie together

Did you read the news item in September's *AU* reporting on the government committee that had complained about the poor quality of teaching using Basic? Well! Regular readers will know that *Acorn User* regards all programming as a necessary part of the skills needed to solve problems. The language we use is largely irrelevant to the problem-solving activity.

Sadly, while I would enjoy writing articles on programming in Comal or Logo, it would be unfair to many users who don't have these languages. Indeed, while micros are sold only with Basic, it is difficult to give readers a diet which provides easy access to another language. So while Basic may be bad, it's what exists. Recent moves with Logo on the Compact front may lead to an expansion into other languages, but we in *Acorn User* must keep our feet firmly on the floor in terms of our expectancy of users converting *en masse* to a 'better' language. Before continuing, may I conduct a grass-roots survey? Why not write to us and say which languages you have, and which you would buy if more articles were written?

The best language?

If you are still interested in choosing the best language, then problems exist, even for our government committee. Rather than say what is the best programming language, I rang a few people 'in the know' and asked them what they thought:

- A primary school teacher said Logo.
- A Scottish friend teaching 15 year-olds said it was Comal.
- A local poly lecturer said Pascal.
- A senior programmer in a national software house said C.
- A software company supporting BBC micros said 6502 Assembler.

Each of the above was able to say why the others were no good and, surprisingly, I found it difficult to find any home users with good applications for Forth, Fortran, Cobol, Algol, or BCPL.

Does this mean that Basic is really far out of favour with everyone? The answer seems to be no, but we are so geared up to knowing that we should be looking for the best language, that we ignore and/or criti-



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(delete as appropriate)

Name: ....

Address: ....

....

....

.... POST CODE ....

cise what we already have. The problem with Basic, we are told, is that it is:

- Too slow.
- Too unstructured.
- Too clumsy for X, Y or Z application.
- Too conceptually unsound.

Yet almost every home micro comes with Basic as a standard language. Firms like Atari are still asking software houses to write the 'definitive' Basic. Companies such as Microsoft produce Mouse-Basic for Apple products. Every computer language has its failings, and what we should really do is to ask:

- Is the application we wish to use appropriate for this langugage?
- Are our coding abilities and talents up to the structures required?
- Do we even think in a relevant structured format?
- Who will use the target program?

Much coded Basic is unstructured *not* because of the failings of Basic, but because of the failure of the programmer to think in a structured way. When even Unix users have a philosopy which states that a working idea is better than none, and that it can at least be improved on, the average home user can hardly be knocked for attempting to solve problems with the tools to hand, ie, BBC Basic.

Building blocks

Still, we should really try to make the best use of Basic, and this often means thinking in a structured way. Compare the program diagrams of figures 1a and 1b. Figure 1a is a form of structure diagram, which is a simple way of showing how the main items of a program hang together. Figure 1b is a flow chart, which shows the flow of execution through a program. Typically a user would draw either of these, before writing any code.

The easiest diagram to follow is figure 1a. This shows that the flow is sequentially through the program, but that each major structure block has sub-blocks. These sub-blocks can be thought of as solutions to sub-problems, which when put together solve the complete problem.

Figure 1b on the other hand attempts to tackle the whole problem in one go, and starts at the beginning, continuing to the end. It is more difficult to solve one large problem in one go, than to solve a number of smaller ones in several stages. The result of this is that we should always search for sub-problems, and solve each sub-problem as a block.

The benefit of thinking in blocks is that

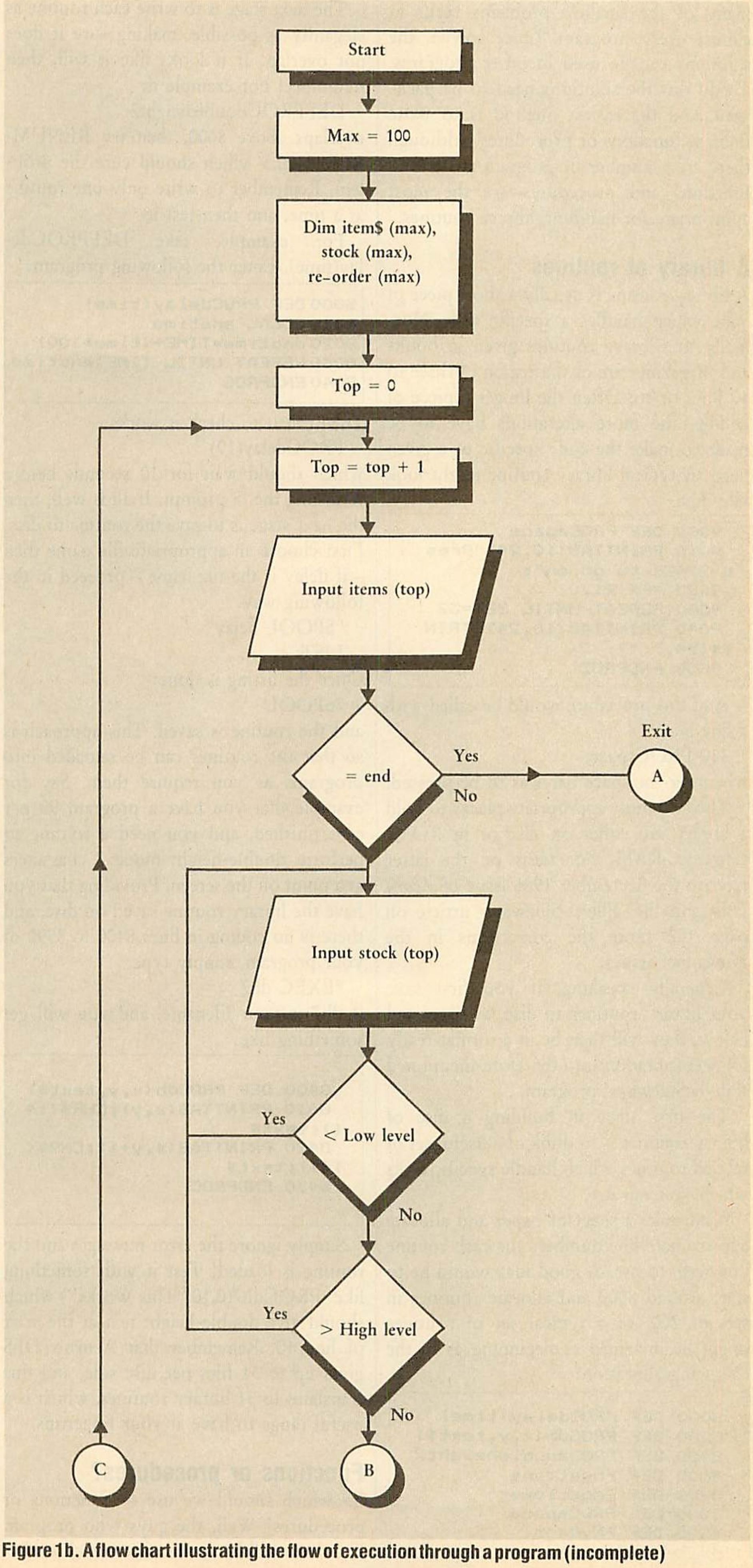


Figure 1b. A flow chart illustrating the flow of execution through a program (incomplete)

many of the smallest problems recur in almost every program. Once solved, the solutions can be used in other programs. To do this the solutions need to be packaged, and the easiest method is to write them as functions or procedures. Although there are a number of program structures, functions and procedures are the most appropriate for handling library routines.

A library of routines

A library routine is usually a short piece of code which handles a specific task. Normally the library routines given in books and magazines are of the region of three to 10 lines or so. Often the longer a piece of coding, the more alterations have to be made to make the code specific to a given need. A typical library routine might look like this:

```
9000 DEF PROCspace
9010 PRINTTAB(10,24)"Pres
s SPACE to go on";
9020 *FX 21,0
9030 REPEAT UNTIL GET=32
9040 PRINTTAB(10,24)STRIN
G$(20," ");
9050 ENDPROC
```

And this procedure would be called with a line like:

110 PROCspace

whenever the space bar was to be pressed.

The two most appropriate places to hold a library are either on disc or in ROM/sideways RAM. For ideas on the latter refer to the September 1986 issue of *Acorn User* and the 'File-it-Sideways' article on page 102 (note the corrections in the November issue).

Generally speaking, if you first save your library routines to disc, as suggested below, they will then be in a format ready for incorporation into the afore-mentioned 'File-it-Sideways' program.

The first stage in building a disc of library routines is to think of a useful set of related routines which handle specific tasks which you can use.

Next, take a sheet of paper and allocate approximate line numbers for each routine you wish to use. A good idea would be to start around 8000 and allocate routines in sets of 200, so a typical set of routines might be imagined as beginning as in the following allocation:

```
8000 DEF PROCdelay(time)
8200 DEF PROCdh(x,y,text$)
8400 DEF PROCdoubleheight2
8600 DEF FNgetcaps
8800 DEF FNgetlower
9000 DEF PROCspace
9200 DEF FNyesno
```

The next stage is to write each routine as elegantly as possible, making sure it does not overlap. If it looks like it will, then renumber! For example if:

DEFPROCdoubleheight2

overlaps above 8600, then try RENUMBER 8400,5 which should cure the problem. Remember to write only one routine at a time, and then test it.

For example, take DEFPROCdelay(time). Enter the following program:

```
8000 DEF PROCdelay(time)
8010 LOCAL endtime
8020 endtime=TIME+(time*100)
8030 REPEAT UNTIL TIME>endtime
8040 ENDPROC
```

Then call it to check it works:

PROCdelay(10)

which should wait for 10 seconds before returning the > prompt. If all is well, then the next stage is to save the routine to disc. First choose an appropriate file name then – if delay is the file name – proceed in the following way.

```
*SPOOL delay
LIST
```

Once the listing is done:

*SPOOL

and the routine is saved. This approach is so that the routines can be reloaded into programs as you require them. Say for example that you have a program 99 per cent finished, and you need a routine to perform double-height mode 7 characters at a point on the screen. Providing that you have the library routine saved on disc, and there is no coding in lines 8400 to 8590 of your program, simply type:

*EXEC dh7

if dh7 is your filename, and you will get something like:

```
8400 DEF PROCdh(x,y,text$)
8410 PRINTTAB(x,y);CHR$(14
1);text$
8420 PRINTTAB(x,y+1);CHR$(
141);text$
8430 ENDPROC
```

Simply ignore the error messages and the routine is loaded! Test it with something like: PROCdh7(0,10,"This Works") which should give double-height text at the start of line 10. Remember that Acorn's DFS gives up to 31 files per disc side, and this translates to 31 library routines, which is a useful range to have at your fingertips.

Functions or procedures?

So which should we use — functions or procedures? Well, the guys who program like there will be no tomorrow reckon that whenever possible (and even when not possible) we should be using functions. This gives us a lead into such wonderful languages as Prolog and APL and they are capable of very efficient program codes. For my part, getting people to use Logo would be an excellent start, and so I follow a simple but important rule of thumb. Procedures are commands, and they do something. Functions are requests and they return something.

So just think for a second. Is what I want to do in this routine going to give me a new single value (a string, integer or decimal number) which I will later wish to process? If the answer is yes, then you must use a function. If, on the other hand, it's no then use a procedure.

Let's look at FNgetcaps, which returns any key input as a capital letter:

```
8600 DEF FNgetcaps
8610 LOCAL char
8620 REPEAT char=(GET AND
223)
8630 UNTIL char>64 AND cha
r<91
8640 =CHR$char
```

Look, too, at FNgetlower which returns key inputs as lower case letters:

```
8800 DEF FNgetlower
8810 LOCAL char
8820 REPEAT char=(GET OR 3
2)
8830 UNTIL char>96 AND cha
r<123
8840 =CHR$char
```

Notice that the =CHR$char in both last lines makes the function return the value indicated as a string!

Of course, calling functions is slightly different from calling procedures. The above routines, FNgetcaps and FNgetlower, can be tested by typing:

PRINTFNgetcaps;FNgetlower

and then pressing any letter key twice. If processing of the key-press must be done, then the function must be slotted into a variable, for example:

key$=FNgetcaps;

Sometimes it becomes important for a function or procedure to call on another routine. The action which should be taken is demonstrated in the library routine FNyesno illustrated below:

```
9200 DEF FNyesno
9210 LOCAL char$
9220 REPEAT char$=FNgetca
ps
9230 UNTIL char$="Y" OR c
har$="N"
9240 =char$
```

which might be tested by this short piece of coding:

```
10 PRINT "Do you want t
o go on?"
20 PRINT "Press Yes or
No (Y/N)";
30 char$=FNyesno
40 IF char$="Y" THEN RU
N
50 END
```

Remember that this requires the use of both DEFFNyesno and DEFFNgetcaps. Readers looking for the DEFdoubleheight2 routine, which works for text in modes 2 and 4, can find this in September's Joe's Jottings, embedded in a number of useful routines for menus (see September's listing 5, lines 330 to 450).

The major library routines discussed in this article are actually found in the yellow pages. The previous library routines were short enough to incorporate into the text to demonstrate the important points about building and using a library.

The library routines in yellow pages do not follow the line-numbering approach suggested previously, but this is no problem, as once entered they can be renumbered to suit your own choice of lines, then tested and spooled as demonstrated previously. In some cases a number of routines are given together, as they can be tested in one go. In such cases follow the instructions set out in figure 2.

1. Test the program.
2. DELETE the unwanted calling lines.
3. RENUMBER to your choice of line numbers, then:
   *SPOOL <filename>
   LIST n,m
   where n and m are the start and end lines of the routine you wish to save. Finally:
   *SPOOL
4. Now delete the lines you have just saved and repeat from 3 above.

Figure 2. If a number of routines are together, and to be tested together, follow these instructions

Character	Meaning
£	Print a pound sign
$	Print a dollar sign
<SPACE>	Print a space
*	Print a *
E	Print this number in exponential notation
–	Print this number with a trailing — sign (if it is negative)
+ (1st character)	Print this number prefixed by a + or –
+ (any other char)	Print this number with a trailing + or –
.	Print this number with a Decimal point
#	This is a digit in the number

Typical configurations of the template and its results are:
PROCusing("#.##E+",12.567) gives 1.26E1 +
PROCusing("+##.###",12.567) gives +12.567
PROCusing("£##.##",12.567) gives £12.56
PROCusing("*   ###.####   *",12.567) gives *   12.5670   *
PROCusing("* ## *",12.567) gives * 12 *

Figure 3. Legal characters in the template and their effects

The print using procedure

'Print using' is a command found in a number of Basics, and its aim is to simplify the printing of numerical values, for example in the listing of amounts of pounds and pence. Listing 1 contains both the library routine and some demonstration calling lines. To store the library routine, you will need to delete up to line 160 and renumber the remainder of the program, then *SPOOL it to disc. Notice how the procedure is called:

PROCusing(template$,number)

where the number is just the number to be printed, but the template$ holds the format in which the number must be printed. The legal characters in the template and their effects are shown in figure 3. The main use of this routine is in printing lists of numbers with the decimal points in a column, and with the precise number of decimal places available.

Notice first that PROCusing has a subprocedure, PROCsigns, which is used to handle the leading and trailing signs. This procedure is always needed when you call PROCusing, and so should in fact be saved with PROCusing itself.

Line 190 contains the string of valid characters, this can be added to as the user wishes. All characters in this string will be printed if they are sent as part of the template. Notice too the almost extravagant use of local variables:

min	indicates whether the number is + or –
spos	indicates the position of the sign
mpos	indicates a trailing minus sign
Eflag	indicates exponential notation to be used
dps	number of decimal places
figs	number of significant figures
1p%,dp,fig.	support variables

Most of the hard work involving positioning the decimal point is done in lines 320 (which checks for exponential (E) notation) and 330 (which recalculates the zone variable @% to match the ##.### template). Line 340 checks for integer numbers and the actual printing is done by lines 350 to 380, which work through the template printing characters which match each other, then the number, and finally any further matching characters.

Two quirks of the coding, which advanced users might wish to alter are first the display of E numbers. The display always operates with one number before the decimal point, so ###.##E is interpreted as #.##E. Second, the display without decimal places, which is rounded down so for example 12.1 becomes 12 as does 12.9. A cure for this is to alter the last statement of line 340 to read as follows,

:no=INT(no+.5)

The intelligent input routine

One of the greatest problems facing the program writer is the fear that a user will enter garbage when an INPUT command occurs. This is difficult to avoid and at the very least can lead to screen displays being wrecked. Imagine for example that you want the user to input a DFS filename. Wouldn't it be useful to force only seven letters of entry at the time of INPUT? Consider too a user who has to type a number: wouldn't it be valuable only to activate the number keys on the keyboard during entry?

Records left to load:		14
Records left to load:		13
Records left to load:		12
Records left to load:		11
Records left to load:		10
Records left to load:		9
Records left to load:		8
Records left to load:		7
Records left to load:		6
Records left to load:		5
Records left to load:		4
Records left to load:		3
Records left to load:		2
Records left to load:		1
Records left to load:		0
All loaded.		
red leds	90	30
green leds	23	20
amber leds	35	30
flashing leds	60	50
opto LDR ORP12	120	40
opto BP 500	70	20
opto OCP 71	20	19
Octal Dtns	30	15
BC 108	120	50
555 Timers	100	35
74LS00	80	20
74LS254	40	12
20×IDC CON SKT	30	12
26×IDC CON SKT	27	12
END	0	0

Figure 4. Lists left in memory for further use

The answers to these questions are self-evident, and to show the benefits of intelligent input we offer listing 2 on the yellow pages, which includes the demonstration calling program and the library routines for FNinputusing and PROCvalid. Both these routines should be used together.

A valid procedure

PROCvalid is a procedure which creates a number of global variables which can be used separately or combined to give sets of characters for FNinputusing. If you wish to design a set of regularly used characters then just add it to the procedure. For example say we want to intelligently input the words yes or no, then it would be useful to add:

395 yesno$="YESNO"

and a word using those letters could be entered using:

choice$=FNinputusing(yesno$,". . .")

Notice that the template in the calling function can be any repeatable character, eg, '. . .' or '###' or '   ', etc. You could even indicate defaults:

choice$=FNinputusing("YESNO", "NO ")

and then if choice$ was a null string (" ") this could be interpreted as no:

IF choice$="NO" OR choice$=" " PROCdono ELSE PROCdoyes

The calling program with FNinputusing simply allows the user to enter an 11-letter name using only capital letters. This is useful because 98 per cent of English forenames are 11 or fewer letters long (11 covers Christopher). Remember that somewhere in the calling program PROCvalid should occur, unless you send all strings to the function explicitly, eg:

("0123456789",'######").

Line 180 prints the template which defines the input area on screen, and then resets the cursor to the start of this area. Lines 210 to 290 actually handle the input using a repeat loop to build up multiple GETs. Notice in line 210 that the function exits when the Return key (CHR$13) is pressed, and that line 250 handles the Delete key, replacing deleted characters from the template. Line 260 checks the validity of any key pressed, and whether the input field width is being exceeded. The check for b%=127 in the same line is simply to prevent an already empty string from being further deleted! Line 270 displays the current legal key-press and adds it to the string which is growing, then loops round again for the next keypress.

The flexibility of FNinputusing is such that readers may wish to design other input routines which make use of it. Listing 3 is one such, where the user is prompted for a title, as in Dear Mr – where Mr is the title. The aim of the function here is to return one of a set of legal titles. The letters of the legal titles are specified in line 170, as DMFIRS from which a number of titles can be created. Because we cannot guarantee that a user will type a 'silly' title like 'SID', we have to compare the input typed with a title list, and this is done in line 190, after first padding the input to four letters made up with spaces. The INSTR of line 190 is arranged in sets of four letters, so that any failure of the input to match a set of four letters is equivalent to the input being garbage, and this results in a demand for re-entry. Note especially that lines 150 and 160 are the means by which we ask for input, and position that input on screen. These will need changing to suit each fresh application.

Readers might like to extend the routine to cope with the titles Hon and Rt.Hon, to explore lines 170 to 190 further. Remember that FNinputusing is needed to test this program! Listing 4 on the yellow pages also makes use of FNinputusing, and is a function to return the date, checked to be a valid calendar date. Notice that lines 170, 190, 220 and 280 specify the points on screen where entry takes place. Note too that although there are three inputs of day, month and year, line 170 shows the three inputs in context and the other lines 190, 220, and 280 overwrite the appropriate letters to make the input seem continuous.

Days are entered between lines 170 and 210 and line 210 forces input to be in the range 01 to 31 with two digits typed, so the ninth has to be entered as 09.

Months are entered similarly between lines 220 and 240, and months like February have to be entered as 02. Line 250 checks for 31 days in September, April, June and November, and if found restarts the routine from the days entry. Line 250 checks for 30+ days in February and again restarts if this is found.

The years from 00 to 99 are entered via lines 280 to 300, and line 310 checks the validity of the date in terms of leap years. The three inputs are then combined (concatenated) in order year, month, day and returned to the calling line. The reason for reversing the logical order is to aid future processing, particularly sorting into age-order. Remember that both FNinputusing and PROCvalid are needed here.

Routines for data entry and filing

Listings 5 and 6 can be entered together and tested. Be careful of the odd line numbers in listing 6 which fits into listing 5. The library routines available include DEFFNitemname, DEFFNstockamount, DEFFNdangerlevel and DEFFNcheck in listing 5 and DEFFNsparefile and DEFFNsavelists in listing 6.

Note too that PROCvalid and FNinputusing are needed to test these routines. Most of the routines are self-documenting, so I shall concentrate on the last three.

FNcheck is a small function which is called with a line like:

PRINT FNcheck(x,lo,hi)

where x is usually an unknown variable, and lo and hi are the range of acceptability for x. If x is in the range, the value −1 is returned otherwise a 0 is returned (true=−1 false=0). The routine is normally called at the end of a REPEAT UNTIL loop, to allow exit from the loop if the number is in range:

UNTIL FNcheck(stock,0,128)

FNsparefile is an equally short routine in listing 6 which is called with a line like:

PRINT FNsparefile(<filename>)
The function then searches for a file with the name indicated and returns a 0 (false) if one exists and a −1 (true) if one does not exist. Hence a true return indicates a spare file, ie, one which can be saved with the name given.

DEFPROCsavelists sequentially saves the items in the three related lists between item(0) and item(top). Notice that the number of items is save in line 450 as the first item in the file. Note also that line 190 must be deleted from listing 5 when combining with listing 6.

Routines to load lists

Listing 7 has three useful routines which can be used to retrieve the datafile from disc – FNfilexists, FNloadlists, and PROCprintlists. Again FNinputusing is needed to test the routines, or replace line 190 with INPUTf$ (naughty!!). The first routine checks whether the named file exists and if so returns a true value. The second function loads the lists back from the sequential file, and the last procedure prints out the contents of the lists as far as the last item on file. The lists are left in memory for further processing. This is demonstrated in figure 4.

Users will need to make one, two or three changes to the list manipulation routines of listings 5, 6, and 7. The first is to increase or decrease the initial size of the list. This is done with a DIM statement, and this normally appears outside the routines at the start of the program eg, in line 150 of listing 7.

The next alteration is to have different list types, for example an address$( ) list instead of the reorder%( ) list. To cater for this remember to change all occurrences of reorder%(to address$(in every program, and then alter the input routines to allow letter entry, and avoid calling FNcheck for that list.

The final alteration is to reduce the number of lists. Reducing the number of lists is demonstrated by the routines of listings 8 and 9 which work with single lists, and are self-documenting.

Just to encourage you to start looking for your own routines, we offer listings 10, 11 and 12, which each have one routine, FNaverage, FNmax and FNmin. FNaverage finds the average of a list of numbers. FNmax finds the largest element and FNmin finds the smallest element. Again, they are self-documenting, so should be easy to follow. Remember that our list is called 'list' whereas yours may not be, so change the name to suit. Our highest element is called 'top' and this is sent to the functions as a parameter. If you don't have 'top', then send your equivalent end of data pointer.

Well there you go, about 27 library routines which you can convert to match your needs, to entertain you during the long winter hours.

Useful references

The following books will provide you with background reference material on functions and procedures:

Procedures and Functions in BBC Basic by D Gregory (Addison Wesley) – reviewed July 1985.

Handbook of Procedures and Functions for the BBC Micro by A and O Bishop (Granada) – reviewed November 1984.

Turn to the yellow pages' index on page 113 to find out where Joe's library routine listings are and how to enter them.



A nice easy start . . .



Eat the time pill for a bonus . . .



Try to get the key . . .

ENTER THE NIGHTMARE WORLD

Test your fingers and your brain designing and playing screens on this platform game

Mark de Weger

Have you ever wanted to write an arcade game, but been put off by the amount and difficulty of coding? Or thought a commercial arcade game was much too difficult or too easy? Did you think you could do better? Then *Castle of Nightmares* is the game for you!

Within the limits of the program, which are almost the limits of your own imagination, you can create a platform-type game with *Castle of Nightmares*. The game is compatible with BBC B, B+, Master and Electron micros. It works with both cassette and disc, though Electron users with a Plus 3 will have to use the tape version, as the program needs all the available memory from &1200 upwards.

The program consists of three parts, the loader program, the screen designer and the game itself. The game features you in the role of the hero, Balbo. A mean dragon, named Smoke, has lured you into the *Castle of Nightmares*. In your hunt for keys to open the doors, you must negotiate the traps the dwarves have set, disappearing platforms, conveyor belts and exploding spikes to name but a few! Before you can enter this fantasy world of fear, destruction and heroism, you will have to enter the listings on the yellow pages (index, page 113). The first listing is the loader program for both the screen designer and the game. It assembles the machine code and sets up music and sprite data.

For the machine code enthusiasts, an explanation of how the assembler routines work follows. If, however, you think that ADC stands for 'Acorn users Do it with Computers', you can simply skip it.

The assembly consists of two main routines. I'll start with the second! This routine uses event five (interval timer crossing zero) to change colours on the screen every tenth of a second. This gives the player the impression the conveyor belts and vibrating platforms are in motion. The actual changing of colours is done using OSWORD &C, the machine code equivalent of VDU 19.

The first routine is for the sprite display, and is much more interesting. It begins on line 450 in listing 1. The value in the accumulator (passed from Basic through the variable A%) tells the routine what should happen to the sprite, after first deleting it. The movement is handled by routines such as 'right1' and 'left2'. The main sprite display routine, 'sprite2', is then called to put the sprite onto the screen. Table 1 shows the addresses which are used by this routine.

In the September, October and November 1984 issues of *Acorn User*, Harry Sinclair explained the two main problems when creating mode 2 sprites, how one byte of the screen memory defines the colours of two pixels, this is done by means of 'interweaving' and how the screen memory is built up (see table 1).

If you understand the answers to these two problems, you won't have much difficulty in understanding the routine 'Sprite2'. Even if you don't quite understand it, you can set up the addresses as illustrated table 1 and use the routine for your own purposes.

'Sprite2' starts by copying the screen address of the sprite to be displayed into &86,87 and loading the X-register with the height of the sprite (lines 2050-2100). A byte of the sprite data is then loaded into the accumulator and EORed with the background colour, then pokes it to the screen (lines 2120-2140).

The sprite data address and the screen address are incremented by one. If the



Home sweet home . . .



Watch out for the spikes . . .



Don't forget the time pill . . .

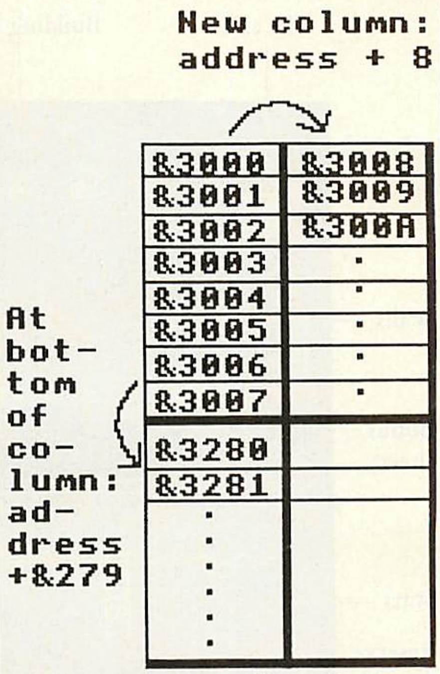
screen address is at the bottom of a mode 2 column, then it has to be incremented by &279 (lines 2150-2310). If you look at figure 1, you will see why. The X-register, which holds the height of the sprite, is decremented and if this has not yet reached zero, the next byte of sprite data is poked to the screen (lines 2330-2340). Otherwise the screen address is incremented by eight (again, see figure 1) and this process repeated until all columns have been displayed (lines 2350-2440).

If you have followed the above, you will realise (provided you are not an absolute beginner) it would be quite easy to change the sprites used by *Castle of Nightmares*. The man-sprite, for example, is eight pixels wide and 16 high. As one byte of mode 2 screen memory defines two pixels, there are (8/2)×16=64 bytes to define. As the sprite routine works column by column, you should group the sprite data by column. It is quite a laborious task to define 64 bytes and it is best to write a simple sprite definer program.

Listing 2 on the yellow pages is the screen designer program, with which you can design screens that are saved to tape or disc, for later use in the game program.

To use the screen editor, chain the loader program (don't forget to set Page to &1700) and select option one. You will be asked if you wish to load a screen from tape or disc. The first time, of course, you won't have created any screens, so answer 'N'. To load a screen, press 'Y'. Disc users will be presented with a catalogue. All screens are saved in directory S and are 'numbered' from A to Z. Press the appropriate letter to load a screen.

Now the program will build up the screen and a cursor will appear. It can be moved using Z, X, : and / keys for left, right, up and down. By pressing one of the number keys, you can place a building block at the cursor. The various blocks are shown at the top of the screen. The spacebar will erase a cell and Return will repeat the last block placed on the screen.



&80,81	screen address of sprite to be displayed
&82,83	data address of this sprite
&84	height of sprite
&85	width of sprite

Figure 1. Top shows mode 2 screen layout and bottom, the bytes used by sprite routines.

It is not possible to edit the top and bottom left corners of the screen, as these are the places where the door and the man are when the game starts.

When you are satisfied with the result press Escape. You will be asked if you wish to save the screen to tape or disc. If so, you will be asked to enter a title of up to 10 characters. This is not the filename, but the title displayed at the bottom of the screen, when you play the game.

After that, a catalogue of the tape/disc will be displayed. Tape users should press Escape when the tape has reached the point at which they wish to save the screen. Then enter a single-character filename. Here you should take care, as the game program first loads screen A, then screen B, etc, until it has reached the last one (this need not be screen Z), at which point the sequence will be repeated.

I would advise tape users to use a different tape for the screen data files and make a note of the tape counter value at the beginning of each screen. This makes it much easier to find and adapt the screens.

The next thing the program needs to know is whether you wish to create or edit another screen. If not, the loader program is chained on the disc version. If you use the tape version, the program simply ends, so that you can stop or chain the game.

The photographs on these pages will give you some idea of the type of things which can be done. The best screens are designed by giving your thoughts free play, changing them if problems occur when playing.

The game is selected as option two of the loader program. Tape users will be asked to enter the number of screens they wish to play before the game starts again. The screens need to have been saved consecutively on the data tape as 'S.A', 'S.B', etc. The disc version will scan the disc to see if there is a next screen to be played, so no need to enter the number of screens.

After loading, tape users will be asked to rewind the data tape, so that the first screen can be loaded. Then the first screen is built up and the fun begins. The object of the game is to collect three keys and use these to open the door in the top left corner of the screen. There is a time limit — on the first level you have 70 seconds. To make this difficult, you encounter many hazards, missiles that have to be avoided, belts transporting you into directions you don't want to go in and platforms that disappear when you walk over them. So there are plenty of ways to be killed! Fortunately, there are more pleasant features: the vibrating platforms give points when they disappear, as do cherries when they are picked up. A time pill restores the time left to complete a screen.



Get your timing right on the jump...



Nasty jumps and threatening missiles...



One of the hardest screens...

Of course you can make screens as easy or as fiendishly difficult as you want by using the screen editor.

Use Z, X, : and/to move left, right, up and down, press Return to jump, Copy to pause the game and Delete to start again. Escape will abort the current game and CTRL-Escape will return you to the loader program on the disc version. If the game is frozen, you can press Q to switch all sounds off and S to switch it on again.

When a screen is completed, the time left is multiplied by 10 and added to your score and the next screen will be loaded. After all screens have been successfully completed, the program will restart with the first screen – with 10 seconds less to complete it. At this point tape users will be asked to rewind the data tape.

For those interested in how the program works, I will give a description.

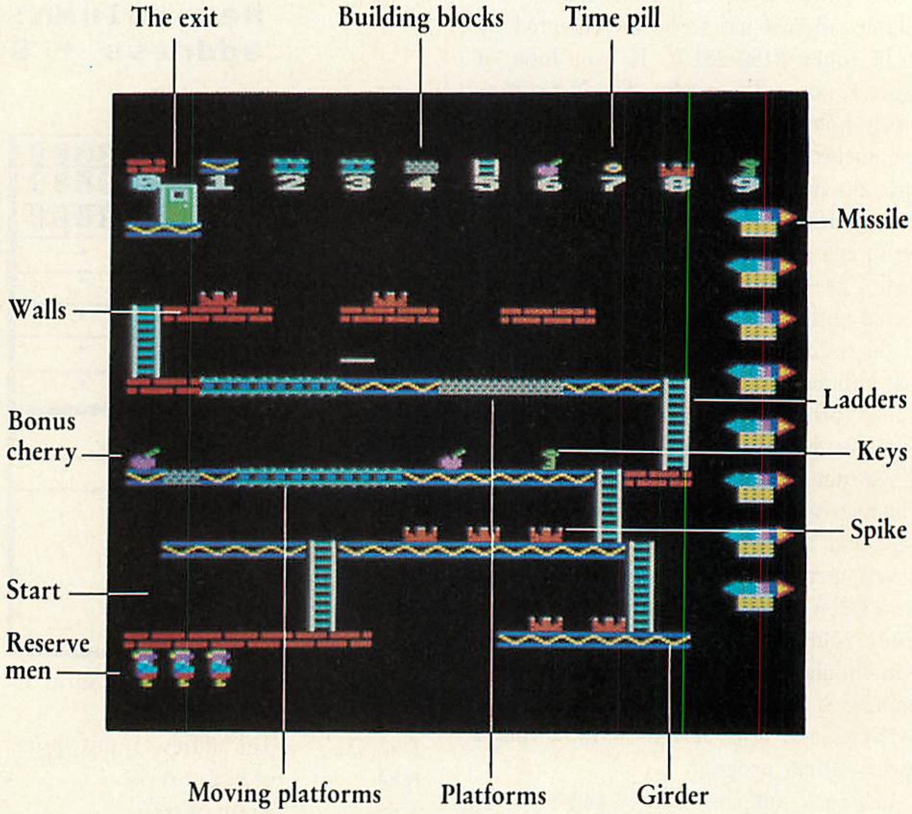
After the variables are set up and a screen loaded, the program enters the main loop, lines 50 to 120. This checks for the keys pressed and then moves the player. It also calls PROCm, which moves the missiles and plays music. Finally, PROCc is executed. This procedure obtains the character at the position of the man and then carries out the appropriate action, making him fall or pick up a key. The loop continues until the player has either completed a screen or been killed, after which lines 130 to 210 work out high scores, and restart the game.

The procedures l, r, u, d and j (jump) move the player if possible and also call PROCm to move missiles and play music. PROCm starts at line 440. It first calls PROCn, which prints the score and the time left, then it plays a note from the tune if there is any room in the sound buffers. Next, it moves a missile and calls PROCk, which kills the player if the missile has hit him, or makes a new missile flicker once when the old one has reached the left of the screen.

The final important procedure is PROCc, which starts at line 820. It first checks if the time has run out and, if so, calls PROCk, which kills the player. Otherwise it uses FNw to find out what the blocks around the man are. If necessary, it then calls certain procedures which restore the time left when a time pill was picked up, or make a vibrating platform disappear if the player walked over it.

As memory is used to full capacity, there is hardly any possibility for program extension. Tape users, however, could try to make the program load in more than one screen at a time — memory from &D00 to &1200 is free on tape-based BBC micros.

I hope you will have lots of fun in designing and playing screens. May *Castle of Nightmares* be a happy dream!



The Castle of Nightmares **designer screen illustrates the components of the game, make them as simple or tough as you want using the screen editor.**

The nightmare continues

The nightmare continues next month when our Dutch author continues *The Castle of Nightmares* saga by explaining how to play the game to the full and will give away hints and tips for success enroute. For example, how to collect the key at the other end of a disappearing platform.

In addition Mark will discuss how to go about designing new screens for you to add and play, providing five more of his own in the process. Do you have any screens of your own? If so we'd like to see them and will publish a selection of the best in forthcoming issues of *Acorn User*. Send them to the office and mark your envelope NIGHTMARE!

Turn to page 113 for details of where to find Castle of Nightmare listings.

PROGRAM NOTES

Procedures and variables used in NIGHTM1

Integers

P%	used by assembler
mc%	start address of machine code
sprites%	start address of sprites data
tune%	start address of tune data

Reals

block1-3	start addresses of data for interval-timer-crossing-zero event setup routine
p-block	workspace for this routine
pass	used by assembler OPT statement

Real arrays

s()	start addresses of data for different sprites

Main assembler labels

entry	entry for sprite routines. Jumps to appropriate routine to move man/missile, depending on the value of A%
right . ./left . ./up . ./down . .	move various man-sprites (left-facing, right-facing etc) left, right etc.
missile	moves missile
sprite1	sets up addresses for sprite2 and then enters this
sprite 2	displays a sprite
delete	deletes man from screen
scr-addr	moves address of man-sprite (in &70,71) into &80,81, necessary for routine sprite2
right/left/up/down	calculate new screen address for man-sprite
cols	event-driven routine to change colours (equivalent of VDU 19)
setup	loads interval timer with 1/10th of a second
clock	contains data for interval timer

Zero page workspace of sprite routines

&70,71	screen address of man-sprite
&72,73	data address of the man-sprite previously displayed
&76,77	screen address of missile
&7A	current direction of man (1=right, 2=left, 3=up)

Procedures

PROCassemble	assembles machine code
PROCchars	defines user-defined characters
PROCcheck-sums	calls PROCcs for various checksums
PROCcs	actual checksum calculating routine
PROCinstr	prints title and gives menu
PROCsetup	sets up variables, envelopes, etc
PROC-sprites	pokes sprites data into memory
PROCtune	pokes tune data into memory

Procedures and variables used in NIGHTM2

Integers

X%, Y%	used by PROCoscli to point to string
a%, b%, c%, d%	co-ordinates used by PROCbox
c1%, c2%	colours used by PROC3d
ch%	state of OPENUP
loop%	loop counter
nr%	various
nx%, ny%	new X- and Y-co-ordinates of cursor
ox%, oy%	old X- and Y-co-ordinates of cursor
prev%	value of last character put on screen
x%, y%	various

Strings

fn$	filename
key$	key pressed
text$	text to be printed by various procedures
yn$	to be (yes) or not to be

Functions

FNfilename	askes for filename
FNyn	asks for yes or no

Procedures

PROC3d	prints a string in '3D'
PROCbox	draws a box
PROC-create	main routine in which screen is created
PROCoscli	issues MOS command
PROCpoke	pokes a value into the screen data area (&900-&AFF)
PROC screen	creates screen from data in the screen data area
PROCset	puts a character on screen
PROCsetup	displays options
PROCstart	loads screen if necessary

Procedures and variables used in NIGHTM3

Integers:

A%	determines what happens to a sprite (deletion, move left, right, etc) when P% is called
B%	flag that is set when the player is 'dead'
C%	X-co-ordinate of man
D%	Y-co-ordinate of man
E%	gives character at position of man
F%	score
G%	maximum time to complete a screen
H%	number of lives left
I%	hi-score
J%	flag that is set when you have completed a screen
K%	number of keys collected
L%	loop counter
M%	X-co-ordinate of missile
N%	Y-co-ordinate of missile
O%	start of tune data
P%	entry address of most sprite routines
Q%	entry address for missile-sprite routines
R%	time left to complete a screen
S%	screen number
T%	pointer to tune data (offset from O%)
U%-Y%	various
Z%	address of sprite routine to display a man-sprite
t%	flag that is set when the tune is off
x%, y%	various

Strings

I$	name of person with hi-score
t$	string to be printed by PROCv

Reals

x, y	various

Functions

FNw	gives value of a position in screen data

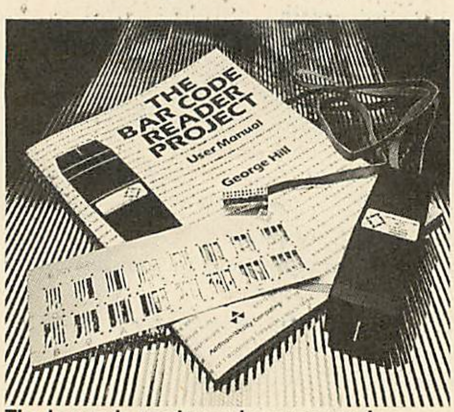
Procedures

PROCa	pokes a value into the screen data area
PROCb	draws a box
PROCc	works out the character at the position of the man and carries out the appropriate action
PROCd	moves man down
PROCe	loads a new screen
PROCf	updates variables and screen if a key is picked up
PROCg	pause routine
PROCj	makes man jump
PROCk	carries out the appropriate action when player is 'dead'
PROCl	moves man left
PROCm	moves missile and plays tune
PROCn	prints score and time left
PROCo	carries out MOS command
PROCp	pauses a while to smooth the action
PROCr	moves man right
PROCs	puts a character on screen
PROCt	makes man fall
PROCu	moves man up
PROCv	prints a string in 3D
PROCz	creates screen from the data in the screen-data area

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DIY WINDOWS

WIMPs have become a popular utility on micros, so here we present a program for you to create your own windows

David Lawrence

WIMPs (or Windows, Icons, Mice, Pointers) are becoming more common on micros, mainly on business machines, such as the Apple Macintosh and IBM PC. Operating systems such as Gem are, however, being converted for home computers.

The essence of WIMPs is, of course, the mouse, which provides a very user-friendly way of moving a pointer around the screen and indicating actions. A typical action might be pointing to a small picture of a typewriter, which would call up a wordprocessor, then pointing to a picture of a disc, which would give a disc catalogue. Further options such as page size or format might then be chosen from a pull-down menu. Half way through the document, a diary might be needed to check a date, so if the mouse was pointed to a picture of a diary, a window would be opened over the document. This window might cover some of the original screen area used by the wordprocessor, but when the diary is finished with, the window closed and control passed back to the wordprocessor, the original screen must be restored. This technique is known as 'windowing' and can also be used for constructing pull down menus (see figure 1).

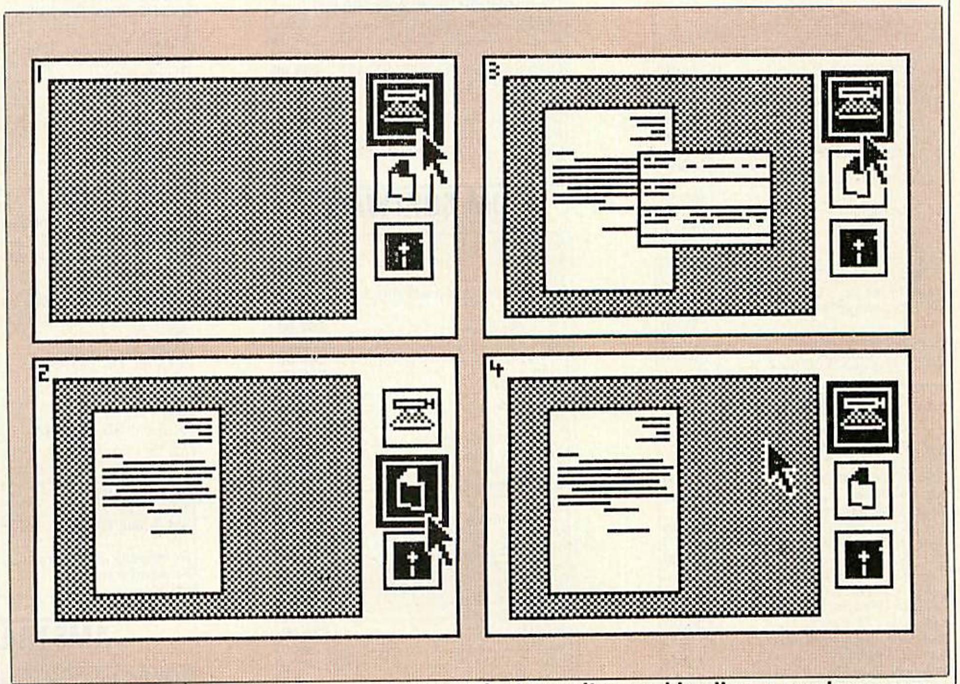


Figure 1. An example of WIMPs — pointing at the typewriter would call up a wordprocessor



A window covering the original screen

A program for windowing isn't difficult to write. All it involves is copying the section of screen memory behind the window to another part of memory and copying it back when the window is closed. My program uses sideways RAM for its window store. If you haven't got any sideways RAM, the program can be adapted to use normal memory, and if you need to do this, read the section below on adaption before continuing. This section should also be read if your sideways RAM is not in slot '&4'.

Listing 1 on the yellow pages is a machine code program that occupies two pages of memory (currently &9 and &A). Enter the program, save it and run it, the program will assemble the code, checksum it and save it as Window. If the checksum is wrong, go back and check the listing. Three procedures are needed in addition to this code, the first for initialisation, one for opening windows and lastly one for window closing.

These procedures can be found in listing 2, also on the yellow pages. They can also be seen in listing 3 which is a short demonstration program.

If you are using sideways RAM and it has a write protect switch, ensure it is switched off before running any program using windows. The program will not work with shadow RAM.

How the program works

There are four main sections to the program, namely, 'Close Window' (lines 360–1110), 'Open Window' (lines 1130–1270), 'Main Routine' ('go') (lines 1290–2290) and 'Ending Routine' (bloop) (lines 2280–2990). 'Block header' refers to a block of memory that is saved in sideways RAM along with the window that tells the computer about various aspects of the window.

The Open Window routine starts by paging in the sideways RAM, and making a copy of the window co-ordinates (these are saved in the 'block header' in the ending routine). A flag is set to tell the main routine to copy from screen to sideways

RAM and the main routine is called. Then the Main Routine finds the address of the top left hand corner of the window.

The method it uses is slightly naughty as it directly peeks the VDU variables in page three of memory (&300 – &3ff). This address is stored three times. One is stored in the block header, one is used as the address of the start of each line (pointer 1) and the other as the address for each character on the line (pointer 2). A copy is then made of the sideways RAM memory pointer which is stored in the block header. This is the address to where the window is saved in sideways RAM. Two nested loops are used for the actual transfer, one for each line and the inner one for each character. The transfer is performed within these loops. Pointer 2 is incremented, one byte at a time, in the inner loop along with the sideways RAM memory pointer. Pointer 1 is incremented by a whole line of bytes in the outer loop (again using VDU variables). These loops are repeated until the whole window is saved or recalled.

The Ending Routine contains code for both opening and closing windows. The main body of the ending routine involves creating the block header for the window saved. Figure 2 illustrates what a block header looks like. The following information is saved: window co-ordinates; sideways RAM memory pointer at the beginning of the memory block; the old text cursor co-ordinates; the foreground and background text colours. The block header is actually a block ender as it is saved after the window, making window closing easier. Finally, a text window is defined to cover the area saved, the foreground and background colours are set as specified and Basic is paged back in.

The Close Window routine pages in sideways RAM, then reads the block header. The co-ordinates of the old window are recovered and used to redefine the text window, the sideways RAM memory pointer is changed to the start of the window in sideways RAM, and then the cursor position and the old colours are restored. Colour restoration, however, is not as easy as you might think. The actual colour numbers (red = 1 etc) are not stored. Instead, the value that would be stored in a byte of screen memory to completely colour that byte to the colour required is stored (see Advanced User Guide, page 277). When a window is opened, this value is stored in the block header, but the VDU variables are write only, so simply writing the values back does not change the colours. Therefore to change the colours back, each colour is selected in turn and the VDU variable is compared with the value stored, and when these are the same, the colour is correct. A flag is set to tell the main routine to copy from sideways RAM to screen and then the main routine is called. The section in the Ending Routine for closing windows simply resets the memory pointer to where it was before the window was opened ready for the next window.

The Basic procedures

The following procedures, PROCinit, PROCopen (L,B,R,T,f,b) and PROCclose should be included in your programs. All three are shown in listing 2. PROCinit sets up the variables used by the program: 'start', 'end', 'open', 'close' and 'slot'.

PROCopen opens a window. The parameters refer to left X, bottom Y, right X, top Y foreground colour and background colour. PROCclose closes the current window. PROCopen and PROCclose both contain error checking, ie, trying to open a window that is too big to fit into the remaining memory or trying to close too many windows.

Adapting the program

If you do not have sideways RAM or it is not in slot '&4', don't despair! The program is adaptable for use in normal memory. Simply change the value of start in line 70 of listing 2 to the address where you wish the windows to be stored. End should also be changed to the highest address available for window storage, I suggest that this is set to the value of HIMEM in the mode you are using. HIMEM should be set near the beginning of your program to start, to prevent the windows being corrupted. Don't worry about the value of slot, as it can be left as it is and nothing nasty will happen.

A fair amount of memory is needed for the storage of windows, especially in modes 0, 1 and 2 (eg, 3200 bytes for a 10 × 10 mode 2 window). So think carefully about the window size.

If the sideways RAM is not in slot &4, change line 90 in listing 2 as appropriate. Also change line 640 of listing 3.

As far as I know, this program should work with any sideways RAM. It has been tested with *Acorn User*'s UserRAM, Watford's Disc RAM and HCR's 32k board.

Unfortunately there is not enough normal RAM available to run listing 3 in its current form. Listing 3a contains some minor modifications that can be made to listing 3 to make it run in mode 4.

If anyone has any ideas for improvements or extensions to this program, I would be very pleased to hear about them. I am currently working on putting the machine code into sideways RAM as well, so windows can be opened and closed simply with *OPEN and *CLOSE. It would also be possible to compact the windows as they are stored thus enabling more, larger, windows to be opened.

Turn to page 113 on the yellow pages for details of where to find David Lawrence's 'windows' program and how to enter it.

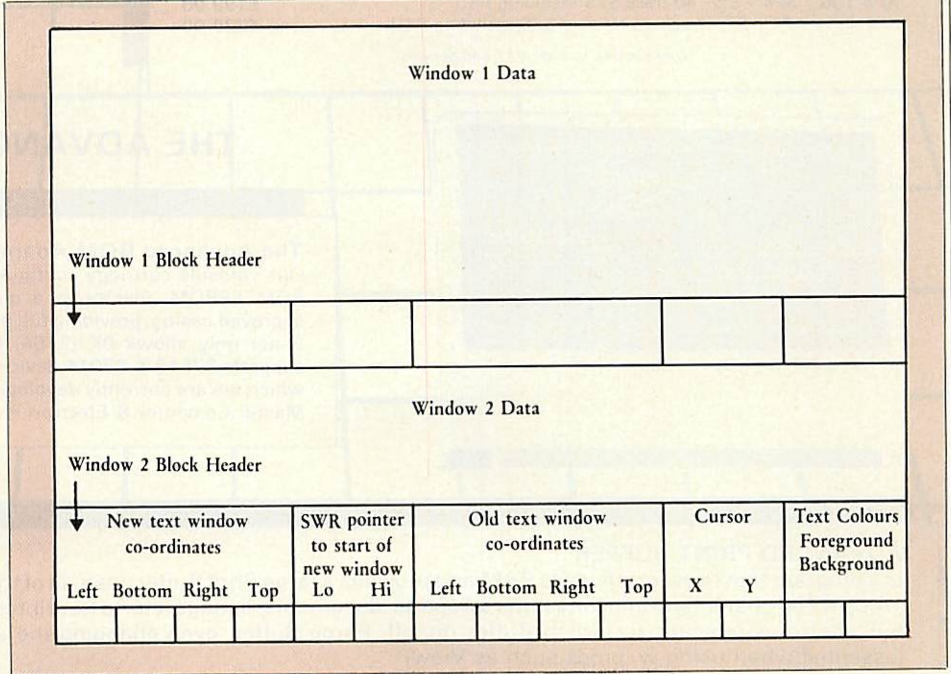
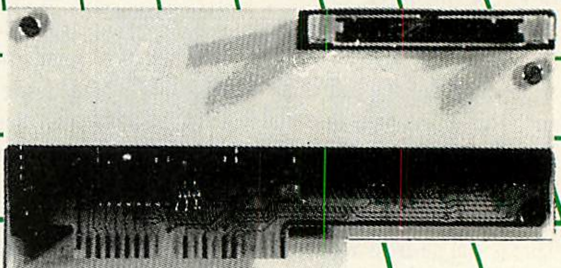


Figure 2. An illustration of the block header and information saved

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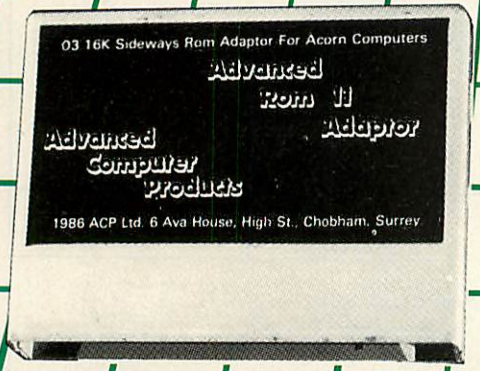
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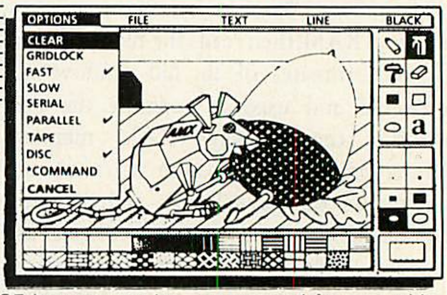
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David Atherton

Many Compact owners will have realised that the Desktop software, the pointer-based file selection system that comes with the machine, only knows about the files on the Welcome disc. Wouldn't it be nice if the headings and lists could be changed so that other discs could be accessed?

This article is about doing just that. Rather than alter individual lines of the Desktop program, we received Acorn's kind permission to alter the whole program and republish it (see yellow pages). The revised program reads the relevant information from a 'directory file', which we tell you how to create.

The Compact Welcome disc starts with a sequence which shows the Master logo, loads some special programs into memory and then brings up the black on light blue screen with pointer and menu bars. It is this last part which we will be altering. The program which does this last display is called Menu and is found in *DIR WELCOME on the Welcome disc.

The Menu program supplied by Acorn works in a very straightforward way. All the files and messages displayed are set up as strings of characters in the program, which makes no attempt to ascertain which files are actually on the disc. We have altered the program to read the names of files and directories which will make up your personalised menu screen from a pre-created text file, so that you don't have to tinker with lines of Basic every time you wish to extend your range of menu items. However, there is no check made that the information in the text file matches the files on the disc – that's up to you!

With our new Menu program, which you can type in from this month's yellow pages, you can have a Desktop Menu on all of your discs. Certain other files must also be on the disc, and there are some rules to be followed on the use of directories. Follow the step-by-step guide in the box on page 102 to set up your Desktop. The guide has been designed to be clear even to those with little programming experience. Once installed the system is easy to use.

```
.....*.......*.......*.......*
Personalised Desktop Software
   for the Master Compact
  Acorn User December 1986
3

DIR Applications,App
View Wordprocesor,VIEW
Logotron Logo,LogLOGO

DIR Sound and Vision,Fun
Sound1,SOUND1
Sound2,SOUND2
Sound3,SOUND3
Triangle,TRI
Square,SQ
Filled Triangle,FTRI
Filled Square,FSQ

DIR Miscellany,Misc
Return to BASIC,QUIT
Return to View,*WORD
```

Figure 1. Directory file as typed into *View*

It might have occurred to you to alter the original program on the Welcome disc to save yourself some typing. Sadly, this is not practical. Although many lines of code in the Welcome disc program perform identical functions to the listing in the yellow pages, it is not really possible to amend the original. This is because the original program has been compressed by joining lines together, to save space. All the REMs and unnecessary spaces have been removed, and also all the variable names have been reduced to the shortest possible number of letters to save space. Acorn kindly supplied us with the original program before compression, using meaningful variable names such as MN$ for menu name, PROCbox to draw a box etc, and the modifications have been done to this version, as a compressed program is almost impossible to modify.

More ambitious layouts

When you select an item on the Desktop Menu, the appropriate disc filename is used to work out which program to read in. This assumes that all the programs are in Basic. However, you may wish to run machine code programs, which have to be started with *RUN, or perhaps you would like the Desktop selection to activate an operating system '*' command. Any non-destructive '*' command will, after execution, return to the main pointer routine.

To do this, just place a star in front of the filename. In the example (figure 1), selecting 'Wordprocessor' from the Desktop will start *View*. If *View* is not installed in the machine RAM, the system will try to *RUN a machine code program called Word on the disc. Sometimes, you can't be sure which ROMs might be in a particular Compact, and thus which names might be picked up as commands, so we have included an extra feature. Type two asterisks and the system will look only on disc, and not use a '*' command.

If you understand ADFS well, you will probably have realised that the file and directory instructions after the comma can refer to directories other than the selected one. For example if a chess program was in DIR Applic, then putting $.Applic.CHESS next to the entry in the games list will find the right file even though the game is not in the directory where it ought to be. Files actually in the $ directory can be accessed by placing them in any directory list, under a filename prefixed by '$'.

Adding to the system

You may want to add small utilities to the Desktop which can be activated from within the Desktop itself. One way of doing this is to write a short Basic program which runs and chains back to the Menu program. This is quite easy; the program can do whatever is necessary and should end with the lines:

```
*DIR^
CHAIN "MENU"
```

Of course the Basic program itself should not alter the current directory.

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ADE+ is 65C00 series assembler system supporting all the mnemonics of the 65C12 used in the latest BBC microcomputers plus the additional 'Rockwell' instructions. ADE+ is fast, faster in fact than the in-built BASIC assembler and all rival products that we have tested. The assembler produces absolute code that can be *RUN or linker modules that can be merged with the output from other programs using the ADE+ linker. ADE+ is the only assembler available on the BBC to support a linker, normally a feature only found on minis and mainframes. The linker will even link the output from compilers with your assembly language programs. Full library support for both the linker and the assembler. Fast searching for unknown instructions in a random access macro library. ADE+ is built as a modular system with many exciting modules to add later such as a mouse based editor or a Z80 cross assembler! A print spooling system uses sideways RAM as a print buffer to eliminate waiting time: your listing runs off as a background job! Use the print spooler from BASIC or your own programs. ADE+ uses ALL available memory. With a second processor attached the IO processor spare memory is used as a buffer to reduce the amount of disc access. Up to 220K of memory is handled by ADE+'s intelligent memory management module. Use your own favourite editor or the one provided. Assemble from disc or memory. Full error diagnostics. Typeset manual with tutorial and reference guide. Supporting software disc. Available in most media formats to order, three formats as standard. (No requests for paper tape please!) Full utilities including librarians, converter for BBC BASIC etc. 32K of ROM software in the basic system. ADE+ must be *the* bargain of 1986/7! Available now.

A comparison of three 65C12 assemblers

Feature	ADE ◆	BBC Basic	MACROM
Number of pseudo-ops	64	4	36
Use of all available RAM	Yes	No	No
Macros	Yes	No	Yes
String functions	Yes	Yes	No
True macro libraries	Yes	No	No
Relocatable output	Yes	No	No
Linker with libraries	Yes	No	No
High level constructs	Yes	Yes	No
Use any editor?	Yes	No	No
Number of error reports	39+warnings	3+BASIC errs	20
65C00 extended opcodes	All	65C12 only	65C12 only
Switch off 65C12 opcodes	Yes	No	No
ROM size	32K	16K	16K
Disassembler	Symbolic	No	Simple
Label restrictions	No	Yes	Yes

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Listing 2 in the yellow pages is an example program which displays the amount of free space available on the disc (using *FREE) and Returns.

Another idea is to put a second copy of the program with a different DIRFILE further down in the directory structure. This would work perfectly well as long as you provided (by use of filenames like $.MENU or ^.Prog) a route back up to the top level. The whole Menu system has been described in terms of the top-level '$' directory, but in fact can work at any level.

Limitations

There are two conditions where the directory file is set up correctly but the software might still produce an incorrect display. The first is where the menus run off the end of the screen. The general way to avoid this is to make sure that the sum of all menu titles doesn't exceed about 65 characters. Also, for the last menu (the one furthest to the right on screen) don't generate long selection titles or the text will wrap around and spoil the display.

The other condition is a memory problem. The sprite ROM which is automatically loaded in by the Desktop front end uses sprite definition space to store the data 'underneath' a pull down menu so that it can be restored when the menu is removed. If a menu is large, for example 10 items with long descriptions, then there may be insufficient room to store the 'behind' screen and the error 'No room to get sprite' will appear.

The maximum number of items that may be placed in a menu list is 11. Using more than 11 names in a single directory entry will cause the menu to crash. Of course you can have more than 11 files in a directory, but only 11 can be accessed directly from the Desktop menu. In general it is good to restrict yourself to say half-a-dozen entries, each containing approximately six files with descriptions of up to 15 characters.

Transferring files

When you create your personalised desktop disc you have to transfer several files from the Welcome disc. You may be wondering just what each of these files is responsible for, so here are a few words on each – we will be covering them in greater depth in a forthcoming article.

- **SPRITER** This program stores one or more little pictures, known as 'sprites', and then places them anywhere you choose on screen. The Desktop calculator and clock are sprites. Repeated drawing at slightly different positions gives an animation effect. Also included in the program is an editor to design your own sprites.
- **PMFS** This program generates and moves the pointer and stores a preferred set of screen colours which can be recalled at any time by the command *SETPAL. Once the program is installed, the pointer is activated by typing *KEYS, and then *POINTER. After this, the brown arrow keys will move the pointer around. The *DIGITAL and *MOUSE commands allow you to use a joystick or mouse.
- **WIMPSPR** A collection of sprite pictures, held on disc, which are designed to work with the spriter program when using the Desktop system. There are 17 sprites in the file. To see, say, sprite five (the floppy disc), type *SCHOOSE 5 Return, then PLOT 237,640,512. To see other sprites, just type a different number after *SCHOOSE. You should first select screen MODE 128.

All three of these programs are loaded in an unusual way, using *SLOAD and *SRLOAD instead of the usual LOAD and CHAIN commands. This is because they are loaded into and run from different areas of memory than most programs. The SPRITER and PMFS programs are known as 'ROM images' because they are written in the same format as a ROM-based program (such as *View* or ADFS) and loaded into sideways RAM.

Most of the Desktop program code reproduced here is that from the Acorn original. I am very grateful to Acorn for their permission to do this. Although the program stands alone, it cannot work without the Pointer and Sprite ROMs. Acorn have asked me to say that they reserve the right to alter the specification of the entry point into the Pointer and Sprite ROMs.

The Personalised Desktop was developed from the unpacked version of WELCOME.MENU on the Master Compact Welcome Disc v1.02, with PMFS 136 (01) and Sprite ROM 0.6 (01).

Creating a boot file

A boot file is simply a collection of instructions for the computer to carry out. In essence you could call it a Basic program but without the line numbers. When a boot file is executed, the computer reads in the boot file a line at a time and executes the commands in the line. When the commands have been carried out the next line is read in and executed and so on until the end of the file has been reached.

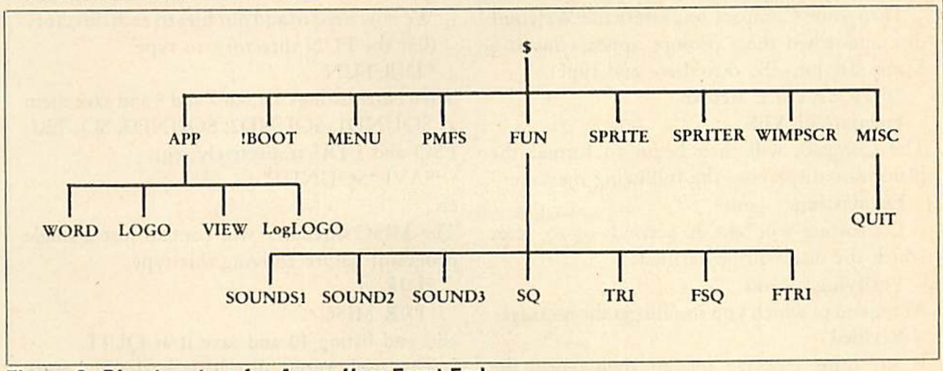


Figure 2. Directory tree for *Acorn User* Front End

There are two ways to create a boot file, and you should try the following demonstrations so that you become familiar with the construction and operation of each. First insert a disc into your drive and type:

```
*MOUNT
```

When the prompt reappears type:

```
*BUILD PRINT
```

The disc will whirl and a number one will appear. Type the following after the line and press Return:

```
MODE 7
```

The number two will appear so type:

```
PRINT "HELLO THERE"
```

Press Return and the number three will appear. Now press the Escape key. Once the disc has finished whirring the boot file will be complete. To test it type:

```
*EXEC PRINT
```

and the result should be some text on a mode 7 screen. The *BUILD method is fine for small boot files but for long ones it's not really useful as there is no editing facility. In such cases we can use *View* to write the boot file.

To try this, install *View* in your micro. With the Welcome disc inserted this is done using the command:

```
*WORD
```

Now type:

```
LOAD PRINT
```

Now press Escape and you should see:

```
MODE 7
PRINT "HELLO THERE"
```

Move the cursor to a blank line at the

STEP BY STEP GUIDE

Customising the front end

This guide allows you to build up a very simple personalised front end of your Master Compact. It will give you a choice of three pull down menus from which some simple options and programs may be chosen. The demonstration programs have been kept deliberately very simple to avoid confusion.

The text below is printed in a variety of ways. Information printed on screen by the computer is shown in bold print, and information that you have to type is in ordinary type.

Turn your Compact on, insert the Welcome disc and when the › prompt appears insert a blank disc into the disc drive and type:

*FORMAT 0 L Return

Format: 0? YES

The Compact will then begin to format the blank disc displaying the following message:

Formatting... ‹no›

Formatting will take 30 seconds or so, after which the disc will be verified:

Verifying... ‹no›

At the end of which you should get the message:

Verified

If any other message appears then repeat the formatting. Once you are satisfied, remove the disc and label it "*AU* Front End". Re-insert the Welcome disc and boot it (press Shift and Break together).

When the Welcome disc Menu program appears you can use the Device/Colour menu to select your default colours, if required. Once this is done, press Break. You will return to the plain start up screen (although it may be in a different mode).

Remove the Welcome disc and re-insert the *AU* Front End (AUFE) disc. Type the following, pressing Return at the end of each line:

```
*MOUNT
*SRSAVE PMFS 8000 A000 5
*SRSAVE SPRITER 8000 A400 4
*SPRITE
*SSAVE WIMPSPR
```

Type:

NEW Return

and enter the "Menu" listing (listing 1) in the yellow pages (index page 113). Once entered (and double checked), save it in the following manner:

```
*DIR
SAVE "MENU"
```

Next we need to build a boot file called $.SPRITE and the boot file section above provides details on how to do this. The information that must be written into the boot file is as follows:

```
*SRLOAD SPRITER 8000 4 I
*SRLOAD PMFS 8000 S I
*SPRITE
*SLOAD WIMPSPR
```

Then build another boot file called !BOOT containing this text:

```
*BASIC
*DIR $
CHAIN "MENU"
```

After this has been performed type:

*OPT 4,3

We have now completed the main task of 'conversion'. The next action on this agenda is to add our own programs. With the AUFE disc in the drive, type:

```
*DIR
*CDIR APP
*CDIR FUN
*CDIR MISC
```

As each *CDIR command is entered the disc drive will whirl as it creates new directories called APP (for applications), FUN (for games, etc) and MISC (for miscellaneous items).

We now need to add our files to each directory – first the FUN directory so type:

*DIR FUN

Then enter listings 3,4,5,6,7 and 8 and save them as SOUND1, SOUND2, SOUND3, SQ, TRI, FSQ and FTRI respectively, eg:

SAVE"SOUND1"

etc.

The MISC directory will contain just a single program; before entering this type:

```
*DIR
*DIR MISC
```

and end listing 10 and save it as QUIT.

The applications directory is slightly more complex as we need to transfer the *View* and Logo files from the Welcome disc to the AUFE. So take care and proceed as follows. Insert the Welcome disc and type:

```
*MOUNT
*WORD
```

this will place you in *View*. Insert the AUFE disc and type:

```
*MOUNT
*DIR APP
*SRSAVE WORD 8000 +4000 7
```

The *View* wordprocessor has now been transfered to the AUFE disc. The next step is to transfer Logotron Logo. Insert the Welcome disc, boot this and once in Logo, press CTRL and Break. Insert the AUFE disc into the disc drive and type:

```
*MOUNT
*DIR APP
*SRSAVE LOGO 8000 +4000 7
```

Enter listing 11 and save this as LogLOGO. Enter listing 12 and save this as View. The LogLOGO and View programs are responsible for loading Logo and *View*.

You might now like to try booting the AUFE disc, so press Shift-Break. You will get a STOP message on the screen which says 'Error, Can't find Dirfile'.

DIRFILE is the file which contains the information for the MENU bar. This can be written as a boot file. (See the directory file section opposite.) Before doing this, however, it is worth sketching out the directory tree structure of the AUFE disc. If you are not familiar with the way a directory tree is constructed, read through the Compact User Guide sections F7 to F13. Figure 2 shows the directory tree structure for the *Acorn User* Front End disc.

Once DIRFILE is installed on disc the AUFE finally is ready for use. This is done by booting the disc in the normal manner and selecting from the menu à la Welcome disc.

bottom and type the following:

PRINT "Compact Lovers!"

There should now be three lines of text, and you can add to this as required.

Return to the Command mode of *View* and save the new file using the command WRITE as follows:

WRITE PRINT

Then type:

```
*BASIC
*EXEC PRINT
```

to see the effects of the new command.

Preparing the directory file

The Desktop Menu works by reading in details from a directory file, DIRFILE, prepared in advance. You must adhere to the file format precisely for the program to work. The file is a text file and can be prepared using *BUILD or *View*, as described above.

The format for DIRFILE is as follows:

Lines 1–3	Three lines of text for screen 'Welcome' box
Line 4	Number of directories defined in file
Line 5	Must be blank
Line 6	DIR Screenname, Discname
Line 7	First file, FIRST
	Second file, SECOND

and so on. Each directory starts with a line of the form DIR Arcade Games, GAMES1 where Arcade Games is the title which will appear on screen, and GAMES1 is a directory on the disc (containing the games).

After the directory description come the files within that directory. Each should be entered by giving the name to be displayed and the filename, separated by a comma. So an entry of Star Fire, SF1 represented a visible menu item called Star Fire which if selected will chain a file called SF1. The file SF1 will, in this case be in directory GAMES1. Figure 1 shows an example of a directory file (typed into *View*).

Note that spaces, colons, asterisks and so on which are not allowed in filenames can of course be used freely in the display text part of the data, which is the bit before the comma on each line.

Remember that as the Menu program is not directly reading filenames from the disc, there is no problem with multi-part programs. The directory file should however, contain a reference to only the first file in such a program.

If you are finding all these files and directories hard going have a look at the ADFS tutorial on your Welcome disc, and pages F8–F19 of the Acorn Compact Welcome manual.

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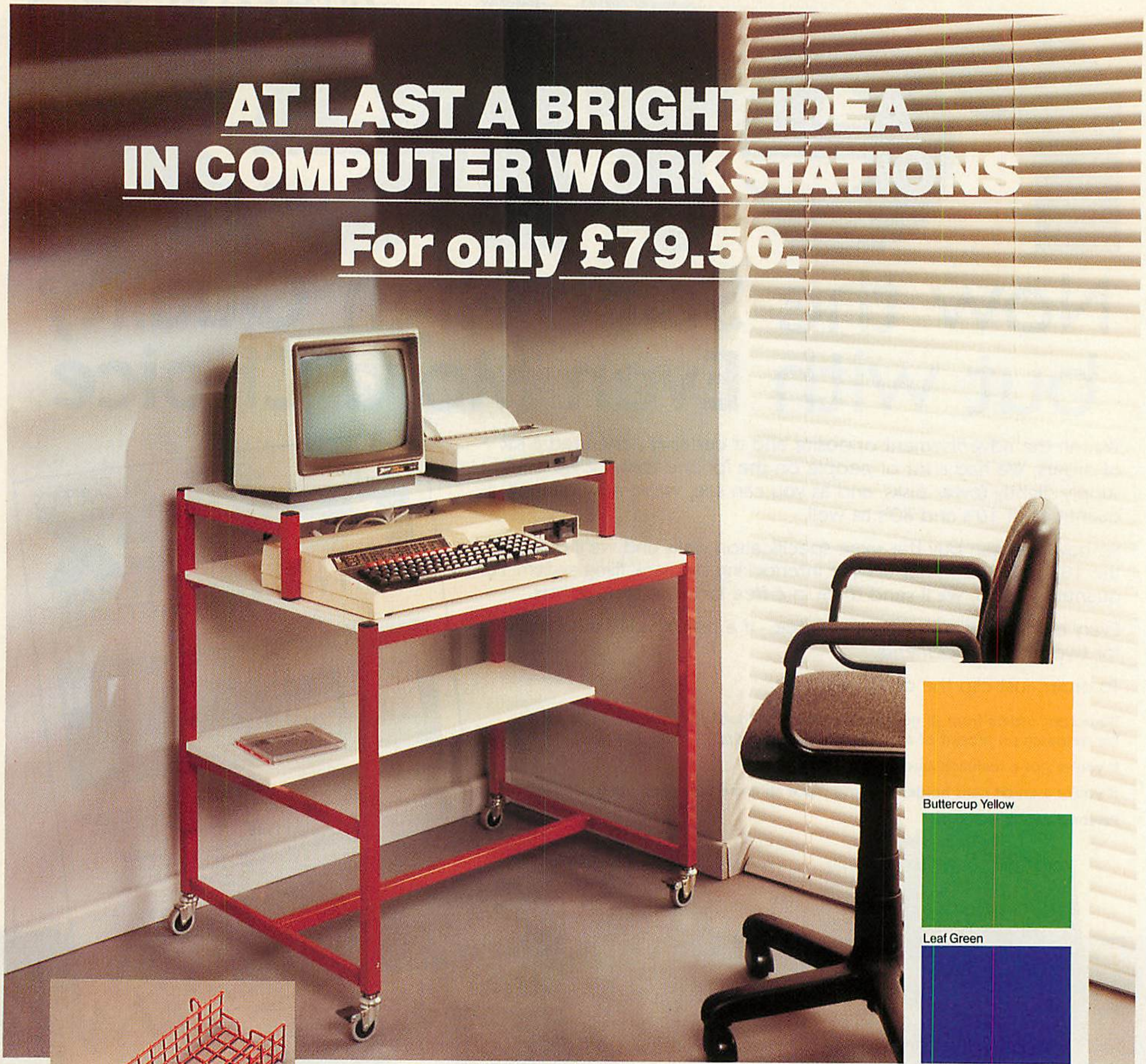
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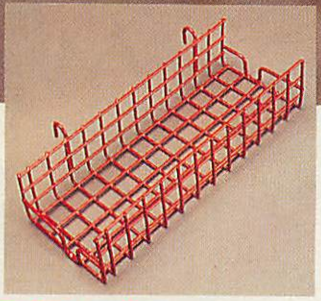


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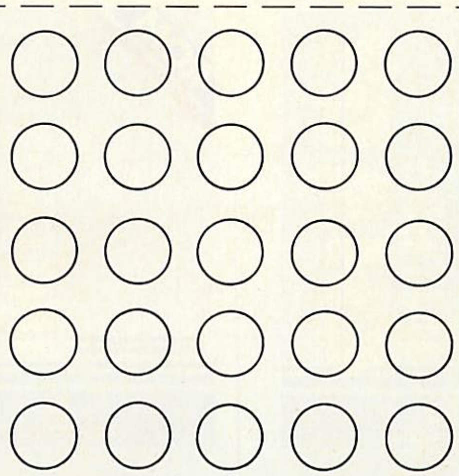
P1	Y1	W1	B1	G1
P2	Y2	W2	B2	G2
P3	Y3	W3	B3	G3
P4	Y4	W4	B4	G4
P5	Y5	W5	B5	G5

General Information Systems' Red Boxes, reviewed by Bruce Smith on page 150, are an exciting new control system for the BBC micro (including the Master and the Compact). Now you can win a Red Box starter pack – worth £129 – in this month's brain-bending competition.

The starter pack consists of three devices: Red Leader, which interfaces with your micro and which you program, Red One, which switches mains devices on and off, and Red Two, a heat-sensitive movement detector. We're giving away five of these packs to the senders of the first five correct solutions we open after December 20.

To enter the competition, you must solve all three of the following teasers, designed to get your brains and possibly your micros whirring.

1 Defining 1 billion the American way (ie, 1000 million), what is the number obtained by adding together all the numbers from 1 to a billion?



1 ______________________

2 ______________________

3 (Fill in P1, Y2, etc in the circles)

NAME ______________________

ADDRESS ______________________

____

2 What is the smallest integer consisting exclusively of the digits 3, 5 and 7 which is exactly divisible by each of these three digits, and the sum of whose digits is also exactly divisible by 3, 5 and 7?

3 In the illustration above, there are five different coloured counters, pink, yellow, white, blue and green, each numbered 1 to 5. Rearrange the counters in the same format (five across and five down) so that no colour or number appears more than once in any of the rows or columns, or in either of the two main diagonals.

How to enter

Fill in your answers in the entry form, left, using the blank circles for question 3, add your name and address, stick the form on a postcard or the back of a sealed envelope and send to December Competition, Acorn User, 141-143 Drury Lane, London WC2B 5TF, to arrive by December 20, 1986.

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INTER-WORD

The latest word processor from the same stable as WORDWISE and WORDWISE PLUS, the most successful programs ever written for the BBC Micro computer. With years of experience and feedback from users, the authors of INTER-WORD have ensured that it suits everyone's needs. A great deal of attention has been paid to ensuring that INTER-WORD is fast, efficient and above all simple to use. Being menu operated the newcomer does not need to remember strange key combinations or command names. The menus are not a burden to the experienced user since there are shortcuts to access many of the features.

REVIEWS

"the most significant program since WORDWISE." ... "INTER-WORD on the BBC Micro compares favourably with word processors costing five or ten times as much on the IBM PC and the like." ... "INTER-WORD is a real pleasure ... a truly worthy successor to WORDWISE"

Gordon Taylor A&B Computing

"Rulers can be used to manipulate text to your satisfaction. This is a joy to use."
"INTER-WORD is certainly an advance on most other word processor packages."

Popular Computing Weekly, July '86

Technically, too, the program is astounding ..."
"... quite stunning handling characteristics"

Viewfax Tubelink—August '86

"INTER-WORD is the most powerful and comprehensive word processor available for the Beeb today. It is more powerful and flexible than View and still retains much of the friendliness and ease of use of Wordwise. Inter-Word looks set to become the standard word processor for the BBC Micro."

Beebug, Aug/Sept '86

Some of its special features are:

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This enables the user to just type - no keys to press to re-format the paragraph after changes to the text or margins have been made; the margins on the rulers can simply be dragged, all text being instantly re-formatted to the new settings.

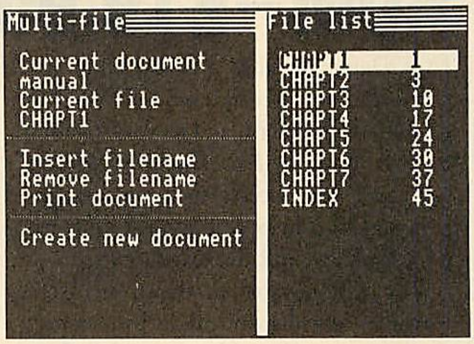
•Multiple documents in memory.
Most people do not work on one document at a time. INTER-WORD allows up to 16 documents to be stored in memory at once, and text to be transferred from one to another.

•Multi column
Built in facilities for printing text in up to 5 columns.

• Pull down menu operation
Simple and fast selection of all INTER-WORD options and page layout.

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Available to all WORDWISE PLUS owners. Simply quote you serial number, name and address when ordering direct. Discount price;
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•Multi-file operation
Very large documents can be handled with ease. INTER-WORD's unique multi-file mode puts virtually no limits on document size and allows simple and fast movement to any point in the document.

•Block operations
These are common to most word processors, but with INTER-WORD any part of the text can be marked and then instantly moved, copied, deleted, printed, saved, underlined etc. There is no limit to the amount that can be marked.

•Specific page printing
Any page or range of pages may be printed, even in multi-file mode, with any number of copies.

•File selector
The file selector displays a list of all files - move to one and select it. You will never have to type or remember filenames again.



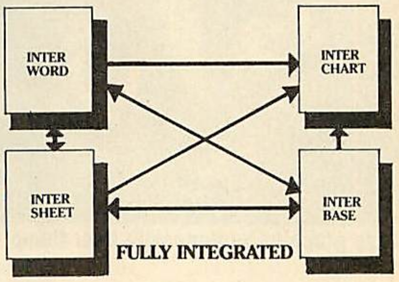
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Computer Concepts

Gaddesden Place, Hemel Hempstead, Herts. HP2 6EX, England. Telephone (0442) 63933

•On screen style changes
Underline, bold and a special 'dotted' style are shown on screen exactly as they would appear on the final printout. Also left, centred and right justified text is shown on screen as you edit. What you see on screen is really what you get on the printout.

•On screen page breaks
You need never lose your place on the page. Top and bottom spaces, with any associated headings, footings or page numbers etc. are shown at all times. Like most features in INTER-WORD, a menu option lets you turn paging off.



•Integrated spelling checker
To be made available soon, this entirely ROM based spelling checker allows text to be checked as it is typed or after typing, at over 9000 words per minute.

•40,53,80 and 106 column screen modes
•Mail merge
•Integrates with all other parts of INTER family
•Automatic page numbering, with headers and footers
•Very fast and smooth scrolling
•Powerful search and replace facilities including wildcards, upper/lower case sensitivity, stored search and replace strings for instant re-use.
•Automatic word count
•Fast simple cursor movement to any point
•Easily tailored to any printer
•Line numbering
•Selectable screen colours
•Compatible with the B, B+ and Master; Solidisk, Aries and Watford shadow RAM boards.

Software is now more important than the hardware, especially with todays falling hardware prices.

INTER-WORD is the most sophisticated and professional word processing package available for the BBC Microcomputer.

MONEY-BACK Guarantee
Buy INTER-WORD—if you don't like it—send it back for a full refund!
(Available when purchasing direct from Computer Concepts)

ACORN USER OFFERS

User Dump – Acorn User's printer control ROM – £19.95



Dump graphics screens with User Dump

User Dump includes a ROM chip which plugs into any free sideways ROM socket on your BBC micro, and an easy-to-follow manual. With the *User Dump* ROM installed you'll have access to a wide range of commands to help you control your printer's facilities – all for just £19.95.

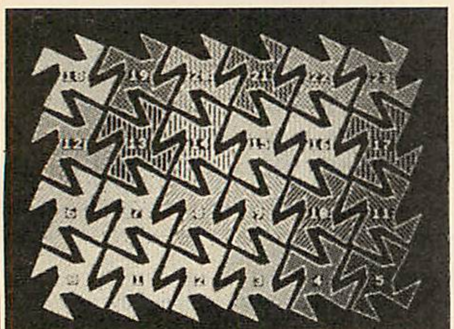
You will be able to dump any screen image in any display mode by entering a single command – either as a line of your program or alternatively by typing in direct from the keyboard. *User Dump* will also give a perfect dump while a machine code program is running.

This versatile ROM will work with all the popular dot-matrix printers, including all those with single and double density big-image graphics.

Send an A4 SAE to Seran at Redwood Publishing, 141-143 Drury Lane, London WC2B 5TF, for details.

Order form on page 130.

User ROM – Acorn User on a chip only £19.95



Dotfill routine from UserROM

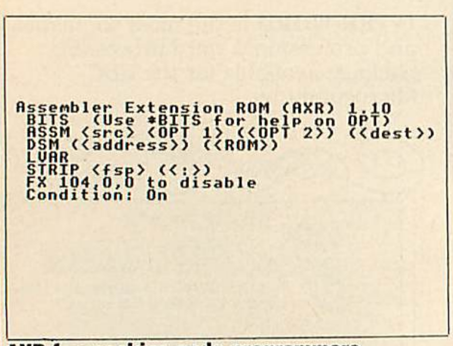
The *Acorn User UserROM* brings the best of *Acorn User* into your micro. Put together by our technical editor, Bruce Smith, this 8k ROM chip is packed with your favourite *Acorn User* routines. Simply plug the ROM chip into a sideways ROM socket and all the routines are instantly accessible via easy-to-use *commands – what could be simpler?

Routines include the popular colour fill and dot fill routines, bad program recovery, variable lister, function key lister, a graphics compiler, a circle drawing routine, sound compiler, plus lots, lots more!

Included with *UserROM* is a 22-page manual which explains how to get the most from your *UserROM*, and you'll find many demonstration programs showing how to use the new commands.

Full details available by sending an A4 SAE to Seran, Redwood Publishing, 141-143 Drury Lane, London WC2B 5TF.

Acorn User Assembler Extension ROM just £19.95!



AXR for machine code programmers

The *Acorn User Assembler Extension ROM (AXR)* is aimed at the machine code programmer. It is compatible with Basic versions 1 and 2 – a Master version is due.

The *AXR* extends the Basic assembler to allow a variety of assembly options and commands. Some are outlined below.

- Bit 0 to 2 – Usual OPT functions
- Bit 3 set – Write to file and RAM
- Bit 4 set – Write to file only
- Bit 5 set – Branch to jump
- Bit 6 set – Enhanced error reporting
- Bit 7 set – Flag duplicate labels

The *AXR* adds several new pseudo op codes to the assembler. These are: ORG – sets the origin for assembly; DST – specify destination; DFB – defines a byte; DFW – define word; DFD – define double word; DFR – define string; SWR – set the sideways RAM number.

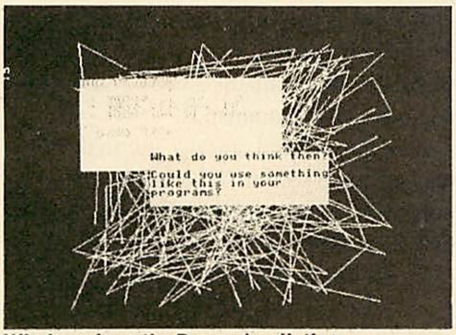
Please send an SAE to Seran at Redwood Publishing for full details.

Telephone Orders 01-836 2441 9.30am to 5.30pm. Ask for Seran – Order form on page 130

PROGRAM LISTINGS

ACORN USER OFFERS

December listings on cassette £3.95 and disc £5.95



Windows from the December listings

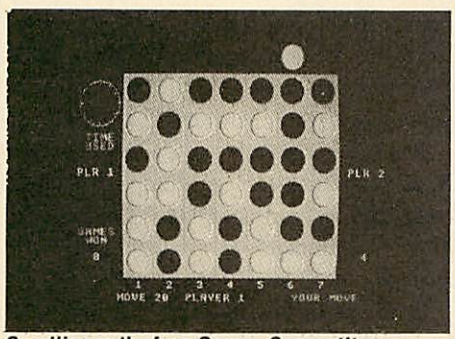
Face the perils of *Castle of Nightmares*, this month's feature program listing. This game is especially designed to allow you to vary the level of skill required, by creating your own screens through which the hero Balbo must find his way!

Plus, use Joe Telford's procedures in your programs; combine several different screens with David Lawrence's 'Windows' and personalise the standard software included with your Compact.

All the programs in this issue are on both disc and cassette. The disc is fully menu driven and a good buy at only £5.95. Electron owners remember the disc is compatible with Advanced Plus 4 disc interface with 5.25in disc drives. There's a special graphics bonus on the cassette and disc. The cassette versions for both the BBC and Electron contains a tape to disc transfer program — all for just £3.95.

Order form on page 129.

Free offers with disc and cassette subscriptions!



Quadline on the free *Games Competiton*

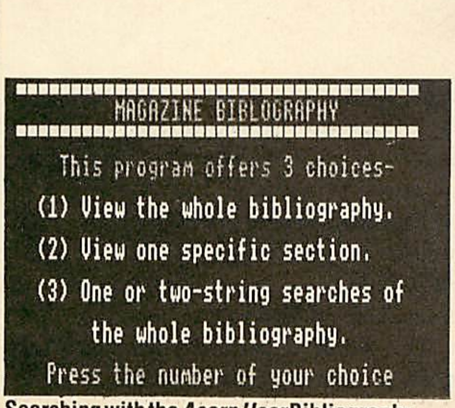
This month you can receive our superb quality disc binder worth £9.95 when you subscribe to our monthly listings disc. Made up in grey cloth, it includes six transparent inserts each capable of holding two 5.25in discs and a protective slip case. Send £69 while this offer lasts. Overseas readers should add £7 for surface mail (and airmail to Europe), or £15 for airmail delivery (to the rest of the world).

Plus receive our new *Acorn User Games Compendium* cassette, free, when you subscribe to our monthly cassette listings, regularly delivered each month for £45.

The *Games Compendium* features some great entertainment for BBC micro, Master and Electron owners. It includes old favourites such as *Spectramania, Quadline, Picture Slide* and *3-D Maze*. You can also go collecting apples in *Shuggy's Garden*, or be all at sea in, *Run·Silent, Run Deep*.

Order form on page 129.

Acorn User bibliography on disc from £7.95



Searching with the *Acorn User* Bibliography

If you've ever spent hours looking through your copies of *Acorn User* for an elusive article, which you know you've seen but can't remember when or where, then what you need is the *Acorn User* bibliography!

Our bibliography contains information on where to find games, listings, educational and utility programs; reviews of hardware, firmware, peripherals, software and books; and feature articles of specific and general interest. You'll even find reference to readers' letters! The *Acorn User* bibliography is sold in parts, in a specially enhanced format, to make your searches even faster, taking about 15 seconds on the 40-track and 40 seconds on the 80-track disc. Location of a reference is by one- or two-string searching and the user may specify the starting month and year.

There are three parts currently available; part 4, will be released soon.

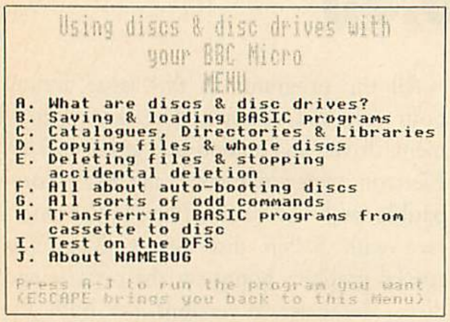
Order form on page 130.

Telephone Orders 01-836 2441 9.30 to 5.00pm. Ask for Seran – Order form on page 130

SPECIAL PROGRAMS

ACORN USER OFFERS

Get out of trouble with the Disc Help Disc – only £6.95



The *Disc Help Disc's* menu page

Have you just bought a disc interface or disc drive? Do you have a disc interface and drive but are bamboozeled by all the jargon? Do you simply want to know all about discs and how to use your disc filing system ROM to its full potential?

If you answer yes to any of these questions then *Acorn User* has the answer in the form of the *Disc Help Disc*, specially developed for the magazine by the North and Mid-Essex BBC Users Group.

Simply insert the *Disc Help Disc* into your drive and all the information you will ever need is at your fingertips. All aspects of file maintenance are covered and a disc filing system simulator allows you to practise use of the commands.

A question and answer tutorial at the end of each section ensures that you are able to evaluate your own knowledge. The disc is in 80-track format only.

Order using the form on page 130.

Wise up with the Education Disc at just £7.95



The *Education Disc* menu page

The *Education Disc* contains programs drawn from *Acorn User* magazine.

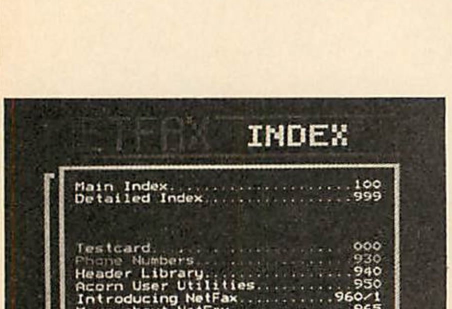
Eco-Fax is a sophisticated viewdata-type database for use on Econet systems, and comes with its own versatile frame editor. There is a colourful version of *Turtle Logo*; a program which shows equations as graphs; and a music writing program which allows you to edit tunes.

Graphics are a strong feature of the collection, including the *Easyplot* drawing software, supported by two other programs which use *Easyplot* screens as an electronic noticeboard or in place of an overhead projector. A bulletin board displays messages in scrolling characters.

There are routines to use in your own Basic programs – screen dumps, a machine code utility and graphics plotting and drawing commands in mode 7. The disc is available in 40 track format only.

Order form on page 130.

Network Utility Disc only £19.95



Bring teletext information to networks

The *Acorn User Network Utility Disc* is the logical addition to your network, combining a wide range of invaluable routines with a sophisticated, yet easy-to-use teletext information system. The disc features:

- NetFax – our hybrid information system, provides thousands of pages of information which may be read without affecting any text or program in memory. It features an advanced teletext editor.
- Utilities for all network users, including a file locator and directory size finder.
- Utilities for network managers, including a bridge-compatible screen viewer and an efficient 'notify-all' facility.
- An auto-installer to transfer all of our utilities to your net painlessly.
- 150 NetFax pages, including instructions, help pages and sample indexes.

The *Acorn User Utility* disc is in 80-track format and costs just £19.95.

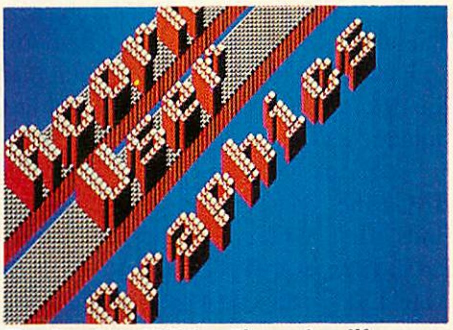
See page 130 for your order form.

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SPECIAL PROGRAMS

ACORN USER OFFERS

Graphics Utilities Disc a bargain at £7.95



The *Graphics Utilities Disc* makes life easy

The *Graphics Utilities Disc* is divided into three easy to use sections.

The Basic procedure library includes multi-height text, shape drawing and screen rotation.

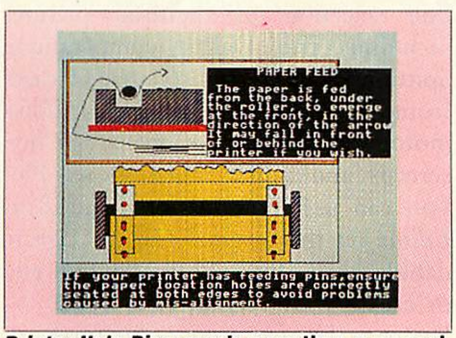
The sprites section designed as a fully integrated package includes: sprite designer, editor, mover, wipe collision detection and levels.

The third section contains an assortment of useful one-off machine code utilities, which perform specific functions such as mode conversion routines, colour filling routines, block graphics, move and copy routines, block rotation and reflection routines.

This disc is only available in 40-track format, but includes an 80-track transfer program. Please note that *Acorn User* retains the right to alter the contents of this disc without obligation.

Turn to page 130 to order.

Acorn User's comprehensive Printer Help Disc at £7.95



Printer Help Disc: much more than a manual

Written by Benjamin Rietti, the programs and tutorials on this disc will help you to understand your printer's facilities.

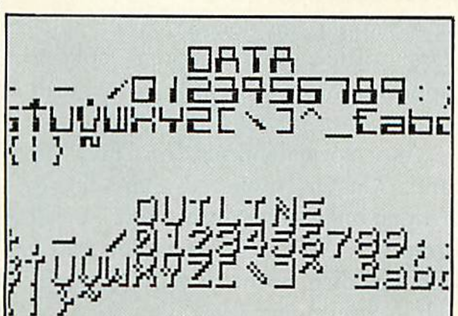
Printer manuals often don't fully cover the needs of Master and BBC micro series owners – our printer help disc will! It includes what to look for in a printer, controlling type styles, using *Wordwise* and *View*, screen images, printer care, an ASCII standard codes table plus how to print £ signs, clear diagrams illustrating various stages of printer use and a program to display type styles. The *Printer Help Disc* will help you solve problems.

The disc is available in 40 and 80 track format, and is compatible with the BBC models B, B+ and Master 128.

For more printer compatibility details please send a stamped addressed envelope to Seran, Redwood Publishing 141-143 Drury Lane, London WC2B 5TF.

Order form on page 130.

Acorn User's Sideways RAM Utilities Disc £9.95



Fonts from the *Sideways RAM Utilities Disc*

What could be more helpful than our new *Sideways RAM Utilities Disc*?

Available in 40 track format with a transfer program for 80 track users, the disc includes:

- Standard header – tack on your own assembly language programs to form into a sideways RAM image.
- On screen fonts – redesign the standard BBC micro character set using the built in character designer and display the new fonts in any graphics mode.
- *HLP ROM – gives instant help on sideways RAM and facilities to add your own *HLP messages.
- * RLOOK and * ROMS look into sideways RAM memory locations and list the ROMs present.

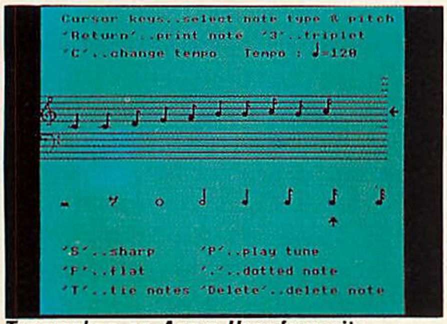
Plus lots, lots more. Order using the form on page 130. Note: *Acorn User* retains the right to alter the contents of this disc without obligation.

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SPECIAL PROGRAMS

ACORN USER OFFERS

Acorn User Finest Favourites Cassette – just £3.95



Tunemaker: an *Acorn User* favourite

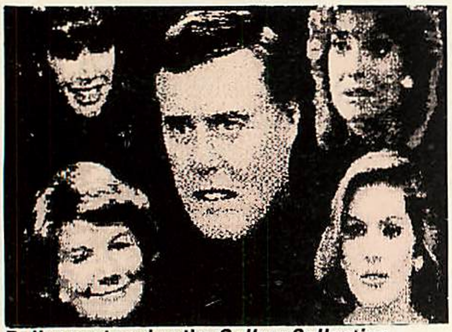
Following the popularity of the *Best of Acorn User* Cassette, we introduce our new favourites selection.

Don't miss captivating curves with *Lisajous Figures* (Nov 85). Use our *Screen Fonts* (Dec 85) to anotate charts and diagrams. And why not save those graphics screens in less space with the *Screen Compression* program (Dec 85).

Cheat at the popular game *Elite* with our *Elite Editor* (Feb 86). Try entering music with *Tunemaker* (March 86). There are *Basic Extensions* (Apr 86) and for the graphics treat of the year the *Mandlebrot Set* (May 86). And last but not least, *Puzzles* (July 86).

Programs will work on the Electron BBC and Master computers. You'll find the order form for *Finest Favourites* and *Best of Acorn User* on page 130 – order now and start having some fun!

New this month! The Gallery Collection – great graphics for only £6.95!



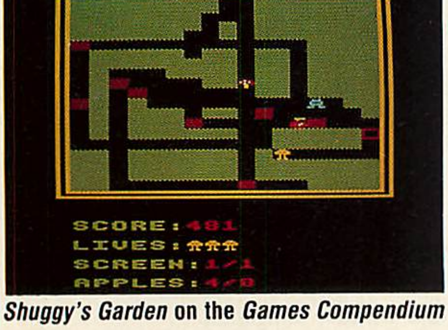
Dallas captured on the *Gallery Collection*

Christmas is not far around the corner, and with you in mind we've put together another stunning range of graphics screens, called the *Gallery Collection*. Combine the *Gallery* disc and *Gallery Collection* disc and you'll have an ideal gift for the graphics enthusiast or treat yourself!

The *Gallery Collection* features an automatic scrolling display of over 25 exciting graphics screens. Enjoy our fine selection of digitised pictures including the Dallas compendium, Spitting Images, and a picture of earth from space. Plus super cartoons, motor cars, some science fiction screens and much much more. Plus you can use *Super Painter* and *Pixel Editor* on the original *Gallery* disc to dabble with a little creativity and edit or create your own screens.

See page 130 for your order form.

Acorn User's Games Compendium Cassette – £3.95



Shuggy's Garden on the *Games Compendium*

The Acorn User Games Compendium brings the best games published in *AU* over the past two years to BBC micro, Master and Electron owners. Included are David Acton's blockbuster *Spectramania* and the popular *Quadline* – see if you can get four in a row! Puzzle fanatics will get great enjoyment from our *Picture Slide* game while many will be amazed at Dave Lawrence's 3-D *Maze*. Adventurers can sample the delights of the *Acorn User* office. Why not go, collecting apples in *Shuggy's Garden*, or be all at sea in *Run Silent, Run Deep*?

As a special bonus for BBC micro and Master owners, there is Rob Anderson's adventure with scrolling graphics. All programs can be transferred to disc automatically if desired. The cassette costs £3.95.

See page 130 for your order form.

Telephone Orders 01-836 2441 9.30 to 5.00pm. Ask for Seran – Order form on page 130

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Your local newsagent or Computer dealer will be pleased to reserve a copy of Acorn User each month. Many newsagents will deliver Acorn User straight to your door. To take advantage of these services, complete the coupon below. Please reserve me a copy of ACORN USER every month until further notice.

☐ I will collect it ☐ Please deliver to my house
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Tel: (0895) 4440555.
Computer Dealers can place orders with Seran on 01-836 2441.

ACORN USER'S GRAPHICS GALLERY

The Gallery Collection disc and our original Gallery disc will make an ideal Christmas gift for all graphics fans. The new Gallery Collection contains digitised screens which automatically scroll through scenes from Dallas, spitting images, a picture of earth from space, as well as many cartoons and sci-fi screens. Both discs are a real Christmas bargain at only £6.95 each.

ACORN USER SPECIAL CASSETTES FOR CHRISTMAS

For great stocking fillers at only £3.95 each, Acorn User special cassettes are perfect Christmas gifts. There are four special cassettes in the range, including the popular Best of Acorn User and Acorn User Graphics cassettes, which are joined this month by Acorn User's Finest Favourites and the Acorn User Games Compendium.

You will find many more Christmas gift ideas on the Acorn User offer pages (108-112).

YELLOW PAGES

INDEX/COMPATIBILITY

Program	Page	BBCB	BBCB+/ 128k	BBC with ADFS	Shadow RAM	Electron	Electron with Plus 1	Electron with Plus 1 & Plus 3	Master 128	Master 128 + ADFS	Master Compact	6502SP	Econet	Monthly tape & disc
Joe's Jottings Listing 1-12	113	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Castles of Nightmares Listing 1	117	Y	Y	N	N	Y	Y	N	Y	Y	Y	N	Y	Y
Listing 2	120	Y	Y	N	N	Y	Y	N	Y	Y	Y	N	Y	Y
Listing 3	122	Y	Y	N	N	Y	Y	N	Y	Y	Y	N	Y	Y
Listing 4	123	Y	Y	N	N	Y	Y	N	Y	Y	Y	N	Y	Y
Windows Listing 1	124	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y
Listing 2	125	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y
Listing 3	126	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y
Listing 3a	126	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y
Menu Maker Listings 1-12	127	N	N	N	N	N	N	N	N	N	Y	N	N	Y

Y = Yes   N = No

See Joe's Jottings, page 81

Listing 1. Procedure to do PRINTUSING

```
  10 REM Listing 1 - PROCusing
  20 REM by Joe Telford
  30 REM for BBC B/B+/M/C/E
  40 REM (c) Acorn User December 1986
  50 :
  60 REM Procedure to do PRINTUSING
  70 :
  80 REPEAT:PRINT
  90 INPUT x:PROCusing("#.##E+",x)
 100 PRINT:PROCusing("+##.###",x)
 110 PRINT:PROCusing("£##.##",x)
 120 PRINT:PROCusing("*   ##.###        *"
,x)
 130 PRINT:PROCusing("*   ##.#####      *-
",x)
 140 PRINT:PROCusing("+*    ##            *
",x)
 150 UNTIL FALSE
 160 :
 170 DEF PROCusing(m$,no)
 180 LOCAL v$,min,mpos,spos,eflag,lp%,dp
,dps,fig,figs
 190 v$="`$ *":IF no<0 min=1 ELSE min=0
 200 no=ABS(no):dp=INSTR(m$,".")
 210 dps=dp
 220 REPEAT:dps=dps+1
 230 UNTIL MID$(m$,dps,1)<>"#"
 240 dps=dps-dp-1:fig=INSTR(m$,"#")
 250 figs=0
 260 REPEAT:fig=fig+1:figs=figs+1
 270 UNTIL INSTR("#.",MID$(m$,fig,1))=0
OR fig>LENm$
 280 spos=INSTR(m$,"+")
 290 IF spos>1 spos=2
 300 mpos=SGN(INSTR(m$,"-"))
 310 IF spos>0 mpos=0
```

Continued ▶

◀ Joe's listing 1 continued

```
 320 eflag=SGN(INSTR(m$,"E"))*&010000
 330 @%=&020000-eflag+(dps+(eflag DIV &1
0000))*256+figs
 340 IF eflag=0 AND dp=0 THEN @%=figs:no
=INTno
 350 FOR lp%= 1 TO LENm$
 360 IF INSTR(v$,MID$(m$,lp%,1))>0 PRINT
 MID$(v$,INSTR(v$,MID$(m$,lp%,1)),1);
 370 IF MID$(m$,lp%,1)="#" PROCsigns(spo
s,min,mpos,0):PRINTno;:PROCsigns(spos,min
,mpos,1):lp%=lp%+figs-1
 380 NEXT lp%
 390 @%=&090A
 400 ENDPROC
 410 :
 420 DEF PROCsigns(sp,m,mp,pos)
 430 IF pos=0 AND sp=1 AND m=0 PRINT"+";
 440 IF pos=0 AND sp<2 AND m=1 AND mp=0
PRINT"-";
 450 IF pos=1 AND sp=2 AND m=0 PRINT"+";
 460 IF pos=1 AND (sp=2 OR mp=1) AND m=1
 PRINT"-";
 470 ENDPROC
```

Listing 2. To check length and valid characters

```
  10 REM Listing 2 - FNinputusing
  20 REM by Joe Telford
  30 REM for BBC B/B+/M/C/E
  40 REM (c) Acorn User December 1896
  50 :
  60 REM Function to handle smart
  70 REM INPUT checking length and
```

Continued ▶

◀ Joe's listing 2 continued

```
  80 REM valid characters. PROCvalid
  90 REM should always be used with
 100 REM FNinputusing.
 110 :
 120 PROCvalid
 130 forename$=FNinputusing(cap$+" ","#
###########")
 140 PRINT'forename$
 150 END
 160 :
 170 DEF FNinputusing(valid$,match$)
 180 PRINT match$;STRING$(LENmatch$,CHR
$8);
 190 LOCAL a$,b%,char
 200 char=ASC(LEFT$(match$,1))
 210 a$=""
 220 REPEAT
 230 b%=GET
 240 IF b%=13 UNTIL TRUE:=a$
 250 IF b%=127 AND a$>"" a$=LEFT$(a$,LE
Na$-1):VDU 8,char,8:UNTIL FALSE
 260 IF INSTR(valid$,CHR$b%)=0 OR LENa$
=LENmatch$ OR b%=127 VDU 7:UNTIL FALSE
 270 VDU b%
 280 a$=a$+CHR$b%
 290 UNTIL FALSE
 300 :
 310 DEF PROCvalid
 320 cap$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
 330 low$="abcdefghijklmnopqrstuvwxyz"
 340 pun$=",.;:!'"
 350 nos$="01234567890"
 360 math$=nos$+"=-~^.*/+<>"
 370 all$=""
 380 FOR loop%=32 TO 126
 390 all$=all$+CHR$(loop%):NEXT
 400 ENDPROC
```

Listing 3. Entering titles such as Dear

```
  10 REM Listing 3 - Enter title
  20 REM by Joe Telford
  30 REM for BBC B/B+/M/C/E
  40 REM (c) Acorn User December 1986
  50 :
  60 REM Function to enter title
  70 REM as in Dear ..... Uses
  80 REM FNinputusing and PROCvalid
  90 :
 100 title$=FNtitle
 110 END
 120 :
 130 DEF FNtitle
 140 LOCAL t$,title$:PROCvalid:CLS
 150 PRINTTAB(0,12);"Please enter your
title: ";
 160 REPEAT PRINTTAB(25,12);
 170 title$=FNinputusing("DFMIRS","....
")
 180 t$=title$+STRING$(4-LENtitle$," ")
 190 UNTIL INSTR("DR  FR  MR  MS  SR  M
RS SIR MISS",t$)>0
 200 PRINT"  O.K."
 210 =title$
```

Listing 4. Procedure to enter and check date

```
  10 REM Listing 4 - Enter date
  20 REM by Joe Telford
  30 REM for BBC B/B+/M/C/E
  40 REM (c) Acorn User December 1986
  50 :
  60 REM Procedure to enter and check
  70 REM date. Uses FNinputusing+PROCva
lid
  80 :
  90 date$=FNgetdate
 100 END
 110 :
 120 DEFFNgetdate
 130 PROCvalid
 140 CLS
 150 REPEAT
 160 REPEAT
 170 PRINT TAB(0,12);"Please enter date
 : DD/MM/YY"
 180 REPEAT
 190 PRINTTAB(19,12);
 200 day$=FNinputusing(nos$,"DD")
 210 UNTIL LENday$=2 AND day$<"32" AND
day$>"00"
 220 REPEAT PRINTTAB(22,12);
 230 mon$=FNinputusing(nos$,"MM")
 240 UNTIL LENmon$=2 AND mon$<"13" AND
mon$>"00"
 250 IF INSTR("04060911",mon$)>0 AND da
y$="31" VDU7:UNTILO
 260 IF mon$="02" AND day$>"29" VDU7:UN
TILO
 270 UNTIL TRUE
 280 REPEAT PRINTTAB(25,12);
 290 yr$=FNinputusing(nos$,"YY")
 300 UNTIL LENyr$=2
 310 IF VAL(yr$) MOD 4 > 0 AND mon$="02
" AND day$="29" VDU7:UNTILO
 320 UNTIL TRUE
 330 PRINT"  O.K."
 340 =yr$+mon$+day$
```

Listing 5. Creating initial stocklist

```
  10 REM Listing 5 - Enterstock
  20 REM by Joe Telford
  30 REM for BBC B/B+/M/C/E
  40 REM (c) Acorn User December 1986
  50 :
  60 MODE 3
  70 PROCvalid:max=100:CLS
  80 DIM Item$(max),stock%(max),reorder
%(max)
  90 PRINT"Creating Initial stocklist -
 Type END to conclude"
 100 :
 110 total=0
 120 FOR item%=1 TO max
 130 total=total+1:PRINT
 140 Item$(item%)=FNitemname(item%)
 150 IF Item$(item%)="END" top=item%:it
em%=max+1
 160 IF item%<=max stock%(item%)=FNstoc
kamount
 170 IF item%<=max reorder%(item%)=FNda
ngerlevel
 180 NEXT item%
 190 END
 560 :
```

Continued ▶

◀ **Joe's listing 5 continued**

```
570 REM simple itemname input routine
580 DEF FNitemname(n)
590 PRINT n;" Item name: ";
600 REPEAT PRINTTAB(22,VPOS);
610 item$=FNinputusing(all$,"---------
------")
620 UNTIL item$>""
630 =item$
640 :
650 REM Get amount of stock
660 DEF FNstockamount
670 PRINTTAB(38,VPOS);"Stock: ";
680 REPEAT PRINTTAB(45,VPOS);
690 stock=VAL(FNinputusing(nos$,"###")
)
700 REM but check until stock is
710 REM between 0 and 128 items
720 UNTIL FNcheck(stock,0,128)
730 =stock
740 :
750 REM enter reordering level
760 DEF FNdangerlevel
770 PRINTTAB(58,VPOS);"Reorder at: ";
780 REPEAT PRINTTAB(71,VPOS);
790 reorder=VAL(FNinputusing(nos$,"###
"))
800 REM must occur between 12 and 60
810 UNTIL FNcheck(reorder,12,60)
820 =reorder
830 :
840 REM Now the range check function
850 DEF FNcheck(quantity,low,high)
860 IF quantity>=low AND quantity<=hig
h THEN =TRUE
870 VDU 7:=FALSE
880 DEF FNinputusing(valid$,match$)
890 PRINT match$;STRING$(LENmatch$,CHR
$8);
900 LOCAL a$,b%,char
910 char=ASC(LEFT$(match$,1))
920 a$=""
930 REPEAT
940 b%=GET
950 IF b%=13 UNTIL TRUE:=a$
960 IF b%=127 AND a$>"" a$=LEFT$(a$,LE
Na$-1):VDU 8,char,8:UNTIL FALSE
970 IF INSTR(valid$,CHR$b%)=0 OR LENa$
=LENmatch$ OR b%=127 VDU 7:UNTIL FALSE
980 VDU b%
990 a$=a$+CHR$b%
1000 UNTIL FALSE
1010 :
1020 DEF PROCvalid
1030 cap$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
1040 low$="abcdefghijklmnopqrstuvwxyz"
1050 pun$=",.;:!'"
1060 nos$="01234567890"
1070 math$=nos$+"=-~^.*/+<>"
1080 all$=""
1090 FOR loop%=32 TO 126
1100 all$=all$+CHR$(loop%):NEXT
1110 ENDPROC
```

Listing 6. Routine to add to listing 5

```
10 REM Listing 6 - Save Lists
20 REM by Joe Telford
30 REM for BBC B/B+/M/C/E
40 REM (c) Acorn User December 1986
50 :
```

Continued ▶

◀ **Joe's listing 6 continued**

```
200 REM these routines can be added
210 REM to Listing 5, the ENTERSTOCK
220 REM program
230 :
240 REPEAT
250 PRINT'"Save to Filename: ";
260 f$=FNinputusing(cap$,"=======")
270 UNTIL FNsparefile(f$)
280 PROCsavelists(f$,top)
290 END
300 :
310 REM rest of program....
320 REM function to check disc
330 REM for an unused file
340 :
350 DEF FNsparefile(f$)
360 LOCAL channel
370 :
380 channel=OPENIN(f$):CLOSE# channel
390 IF channel=0 THEN =TRUE ELSE =FALS
E
400 :
410 REM procedure to save lists
420 DEF PROCsavelists(f$,t)
430 LOCAL loop%:PRINT
440 channel=OPENOUT(f$)
450 PRINT# channel,t
460 FOR loop%=1 TO t
470 PRINT"Records left to save:"t-loop
%:VDU 11
480 :
490 PRINT# channel,Item$(loop%)
500 PRINT# channel,stock%(loop%)
510 PRINT# channel,reorder%(loop%)
520 NEXT
530 CLOSE# channel
540 PRINT"All saved.";STRING$(25," ")
550 ENDPROC
```

Listing 7. To load a set of related lists

```
10 REM Listing 7 - Load lists
20 REM by Joe Telford
30 REM for BBC B/B+/M/C/E
40 REM (c) Acorn User December 1986
50 :
60 REM Program and routines
70 REM to load a set of related
80 REM lists from a sequential file
90 REM FNinputusing & PROCvalid are
100 REM both needed.
110 :
120 MODE 3
130 PROCvalid
140 max=100:CLS
150 DIM item$(max),stock%(max),reorder
%(max)
160 :
170 REPEAT
180 PRINT'"Load from filename: ";
190 f$=FNinputusing(cap$,"=======")
200 UNTIL FNfilexists(f$)
210 top=FNloadlists(f$)
220 PROCprintlists(top)
230 END
240 :
250 REM Check disc for a named file
260 DEF FNfilexists(f$)
270 LOCAL channel
```

Continued ▶

◀ Joe's listing 7 continued

```
 280 channel=OPENIN(f$)
 290 CLOSE# channel
 300 IF channel=0 THEN =FALSE ELSE =TRU
E
 310 :
 320 REM Loading routine
 330 DEF FNloadlists(f$)
 340 LOCAL loop%,t:PRINT
 350 channel=OPENIN(f$)
 360 INPUT# channel,t
 370 FOR loop%=1 TO t
 380 PRINT"Records left to load:"t-loop
%:VDU 11
 390 INPUT# channel,item$(loop%)
 400 INPUT# channel,stock%(loop%)
 410 INPUT# channel,reorder%(loop%)
 420 NEXT
 430 CLOSE# channel
 440 PRINT"All loaded.";STRING$(25," ")
 450 =t
 460 :
 470 REM Print whatever is loaded
 480 DEF PROCprintlists(t)
 490 FOR loop%=1 TO t
 500 PRINT item$(loop%);STRING$(20-LENi
tem$(loop%)," ");
 510 PRINT stock%(loop%);
 520 PRINT reorder%(loop%)
 530 NEXT
 540 ENDPROC
```

Listing 8. To save a list of items

```
  10 REM Listing 8 - Save Lists
  20 REM by Joe Telford
  30 REM for BBC B/B+/M/C/E
  40 REM (c) Acorn User December 1986
  50 :
  60 DEF PROCsavelist(f$,t)
  70 LOCAL loop%,t
  80 PRINT
  90 channel=OPENOUT(f$)
 100 PRINT# channel,t
 110 FOR loop%=1 TO t
 120 PRINT"Records left to save:"t-loop
%:VDU 11
 130 PRINT# channel,list$(loop%)
 140 NEXT
 150 CLOSE# channel
 160 PRINT"All saved.";STRING$(25," ")
 170 ENDPROC
```

Listing 9. Function to load a list from a sequential file

```
  10 REM Listing 9 - Load List
  20 REM by Joe Telford
  30 REM for BBC B/B+/M/C/E
  40 REM (c) Acorn User December 1986
  50 :
  60 DEF FNloadlist(f$)
  70 LOCAL loop%,t:PRINT
  80 channel=OPENIN(f$)
  90 INPUT# channel,t
 100 DIM list$(t)
 110 FOR loop%=1 TO t
 120 PRINT"Records left to load:"t-loop
%:VDU 11
```

Continued ▶

◀ Joe's listing 9 continued

```
 130 INPUT# channel,list$(loop%)
 140 NEXT
 150 CLOSE# channel
 160 PRINT"All loaded.";STRING$(25," ")
 170 =t
```

Listing 10. Function to return the average

```
  10 REM Listing 10 - Average List
  20 REM by Joe Telford
  30 REM for BBC B/B+/M/C/E
  40 REM (c) Acorn User December 1986
  50 :
  60 DIM list(100)
  70 PRINT"Enter numbers: enter -1 to f
inish"
  80 top%=0
  90 REPEAT top%=top%+1
 100 INPUT list(top%)
 110 UNTIL list(top%)=-1 OR top%=100
 120 IF list(top%)=-1 THEN top%=top%-1
 130 PRINT"The average of these numbers
 is: ";FNaverage(top%)
 140 END
 150 :
 160 DEF FNaverage(t%)
 170 LOCAL total,loop%
 180 total=0
 190 FOR loop%=1 TO t%
 200 total=total+list(loop%)
 210 NEXT
 220 =total/t%
```

Listing 11. Function to return largest number in a list

```
  10 REM Listing 11 - Max List
  20 REM by Joe Telford
  30 REM for BBC B/B+/M/C/E
  40 REM (c) Acorn User December 1986
  50 :
  60 DIM list(100)
  70 PRINT"Enter numbers: -1 ends."
  80 top=0
  90 REPEAT top=top+1
 100 INPUT list(top)
 110 UNTIL list(top)=-1 OR top=100
 120 IF list(top)=-1 THEN top=top-1
 130 item=FNmax(top)
 140 PRINT"The largest item is no: ";it
em
 150 PRINT"Which has a value of : ";lis
t(item)
 160 END
 170 :
 180 DEF FNmax(t)
 190 LOCAL max,item,loop%
 200 max=-1E38:item=0
 210 FOR loop%=1 TO top
 220 IF list(loop%)>max THEN max=list(l
oop%):item=loop%
 230 NEXT
 240 =item
```

Listing 12. Find the smallest item in a list

```
   10 REM Listing 12 - Min List
   20 REM by Joe Telford
   30 REM for BBC B/B+/M/C/E
   40 REM (c) Acorn User December 1986
   50 :
   60 DEF FNmin(t)
   70 LOCAL min,item,loop%
   80 min=1E38:item=0
   90 FOR loop%=1 TO t
  100 IF list(loop%)<min THEN min=list(l
oop%):item=loop%
  110 NEXT loop%:=item
```

How to enter Castle of Nightmares

Listing 1 contains four separate checksums, so any typing errors will show up. The program will not checksum the VDU 23 statements on a Master, therefore double check the VDU 23 statements.

Due to lack of memory listing 3 is very compact. Be careful when entering the listing as any extra characters will give a 'no room' error. Also, do not enter the REMs at the beginning of the program.

The game stores code from &1200 to &1900 so BBC ADFS and Electron users with Plus 3 will have to use the tape version.

Listing 4 contains three sample screens in a special compacted format to start you off. When run screens A to C will be created, checked for errors and saved in the 'S' directory. Master users should create the directory 'S' first by inserting the disc and typing:

**CDIR S ‹RETURN›' '*DIR S ‹RETURN›*

To make the game works from tape, enter the listings as they are and make the changes listed below.

Cheats, can make the following changes after which, resave the game. Now when you are asked to press Space (after the high score), pressing 'A' will start on screen A, 'B' on screen B and so on. The cheat mode allows you to start on any level.

See Enter the Nightmare World, page 88

Changes to listing 1 for use with tape

```
   85 *OPT 1,1
 4885 IF G%=1:GOTO 4890
 4886 PRINT''"Number of screens? (1-26)
";:INPUT""nrs%:IF nrs%<1 OR nrs%>26:GOTO
 4886 ELSE ?&CFF=nrs%
```

Changes to listing 2 for use with tape

```
    1 REM Delete lines 770, 810 and 2260
  800 ch%=1
 2181 COLOUR 1
 2182 PRINT'"Press <ESCAPE> to save."'
 2183 ON ERROR GOTO 2545
 2184 COLOUR 3
 2195 ON ERROR GOTO 2350
```

Changes to listing 3 for use with tape

```
   30 ON ERROR GOTO33
   31 K%=0:IF S%=?&CFF OR S%=0:S%=0:G%=G
%-100:PROCo("FX13,5"):VDU22,1:COLOUR1:PR
INT'"Rewind data tape and press <ESCAPE>
."'':COLOUR3:PROCo(".")
   33 MODE2:PROCo("FX14,5"):CALL&165C:VD
U23;8202;0;0;0;:ON ERROR GOTO1100
   34 PROCe
  530 DEFPROCe:S%=S%+1
  540 PROCo("LOAD S."+CHR$(S%+64)+" 900"
):CLS:PROCz:ENDPROC
 1100 PROCo("FX15"):GOTO170
```

Cheat mode changes to listing 3

```
   10 S%=0:P%=&1400:Z%=&154E:Q%=&14E7:O%
=&1390:I%=0:I$="The Master":t%=0:ON ERRO
R GOTO1100
   20 G%=7000:F%=0:PROCo("FX13,5"):MODE2
:VDU23;8202;0;0;0;:H%=3:CALL &165C:*FX14
,5
  210 PROCo("FX15"):S%=GET-65:GOTO 20
```

Listing 1. The sprite display

```
   10 REM Castle of Nightmares Listing 1
   20 REM By Mark de Weger
   30 REM BBC B/B+/M/C/E
   40 REM (c) Acorn User December 1986
   50 :
   60 IF PAGE<>&1700 THEN PRINT'"PAGE sh
ould be at &1700":END
   70 *FX 13,5
   80 MODE 6
   90 IF (!&220 AND &FFFF)<&8000:GOTO160
  100 PROCsetup
  110 PROCsprites
  120 PROCtune
  130 PROCchars
  140 PROCassemble
  150 PROCchecksums
  160 PROCinstr
  170 END
  180 :
  190 DEF PROCsetup
  200 DIM s(6)
  210 sprites%=&1200
  220 tune%=&1390
  230 mc%=&1400
  240 block1=&1680
  250 block2=&1686
  260 block3=&168C
  270 p_block=&1692
  280 block1!0=&90008
  290 block1!4=&8070A
  300 block1!8=&A0709
  310 block1!12=&90708
  320 block1!16=&A
  330 p_block!1=0
  340 ENVELOPE1,2,-1,1,-1,0,0,0,126,126,
-3,-3,80,80
  350 ENVELOPE2,1,-10,20,-10,33,33,33,25
,-1,-1,-2,100,80
  360 ENVELOPE3,1,0,0,0,0,0,0,127,-1,-1,
-1,100,70
  370 ENVELOPE4,1,2,3,4,21,21,21,127,0,0
,-127,126,0
  380 *FX 4,1
  390 ENDPROC
  400 :
  410 DEF PROCassemble
  420 FOR pass=0 TO 2 STEP 2
```


Continued ▶

◀ **Castle of Nightmares listing 1 continued**

```
430 P%=mc%
440 [ OPT pass
450 :
460 .entry
470 PHA
480 CMP #&F
490 BCC man
500 JMP missile
510 .man
520 JSR delete
530 PLA
540 CMP #1
550 BEQ right1
560 CMP #2
570 BEQ right2
580 CMP #3
590 BEQ left1
600 CMP #4
610 BEQ left2
620 CMP #5
630 BEQ up1
640 CMP #6
650 BEQ up2
660 CMP #7
670 BEQ up3
680 CMP #8
690 BEQ up4
700 CMP #9
710 BEQ up5
720 CMP #&A
730 BEQ down1
740 CMP #&B
750 BEQ down2
760 CMP #&C
770 BEQ down3
780 CMP #&D
790 BEQ down4
800 CMP #&E
810 BEQ down5
820 :
830 .right1
840 JSR right
850 .r_enter
860 LDX #s(1) MOD 256
870 LDY #s(1) DIV 256
880 LDA #1
890 STA &7A
900 JMP sprite1
910 :
920 .right2
930 JSR right
940 LDX #s(2) MOD 256
950 LDY #s(2) DIV 256
960 LDA #1
970 STA &7A
980 JMP sprite1
990 :
1000 .left1
1010 JSR left
1020 .l_enter
1030 LDX #s(3) MOD 256
1040 LDY #s(3) DIV 256
1050 LDA #2
1060 STA &7A
1070 JMP sprite1
1080 :
1090 .left2
1100 JSR left
1110 LDX #s(4) MOD 256
1120 LDY #s(4) DIV 256
1130 LDA #2
1140 STA &7A
1150 JMP sprite1
1160 :
1170 .up1
1180 JSR up
1190 .u_enter
1200 LDX #s(5) MOD 256
1210 LDY #s(5) DIV 256
1220 LDA #3
1230 STA &7A
1240 JMP sprite1
1250 :
1260 .up2
1270 JSR up
1280 JMP right1
1290 :
1300 .up3
1310 JSR up
1320 JMP left1
1330 :
1340 .up4
1350 JSR up
1360 JMP r_enter
1370 :
1380 .up5
1390 JSR up
1400 JMP l_enter
1410 :
1420 .down1
1430 JSR down
1440 JMP u_enter
1450 :
1460 .down2
1470 JSR down
1480 JMP right1
1490 :
1500 .down3
1510 JSR down
1520 JMP left1
1530 :
1540 .down4
1550 JSR down
1560 JMP r_enter
1570 :
1580 .down5
1590 JSR down
1600 JMP l_enter
1610 :
1620 .missile
1630 PLA
1640 LDA #s(6) MOD 256
1650 STA &82
1660 LDA #s(6) DIV 256
1670 STA &83
1680 LDA &76
1690 STA &80
1700 LDA &77
1710 STA &81
1720 LDA #8
1730 STA &84
1740 LDA #8
1750 STA &85
1760 JSR sprite2
1770 LDA &76
1780 SEC
1790 SBC #16
1800 STA &76
1810 BCS nh6
1820 DEC &77
1830 .nh6
1840 LDA &76
1850 STA &80
1860 LDA &77
1870 STA &81
1880 LDA #s(6) MOD 256
1890 STA &82
1900 LDA #s(6) DIV 256
1910 STA &83
1920 LDA #8
1930 STA &85
1940 JMP sprite2
1950 :
1960 .sprite1
1970 STX &72
1980 STX &82
1990 STY &73
2000 STY &83
2010 LDA #4
2020 STA &85
2030 :
2040 .sprite2
2050 LDA &80
2060 STA &86
2070 LDA &81
2080 STA &87
2090 LDY #0
2100 LDX &84
2110 .loop
2120 LDA (&82),Y
2130 EOR (&86),Y
2140 STA (&86),Y
2150 INC &82
2160 BNE nh1
2170 INC &83
2180 .nh1
2190 LDA &86
2200 AND #7
2210 CMP #7
2220 BNE one_down
2230 LDA &86
2240 ADC #&78
2250 STA &86
2260 LDA &87
2270 ADC #2
2280 STA &87
2290 JMP over
2300 .one_down
2310 INC &86
2320 .over
2330 DEX
2340 BNE loop
2350 CLC
2360 LDA &80
2370 ADC #8
2380 STA &80
2390 BCC nh2
2400 INC &81
2410 .nh2
2420 DEC &85
2430 BNE sprite2
2440 RTS
2450 :
2460 .delete
2470 JSR scr_addr
2480 LDA &72
2490 STA &82
2500 LDA &73
2510 STA &83
2520 LDA #16
2530 STA &84
2540 LDA #4
2550 STA &85
2560 JMP sprite2
2570 :
2580 .scr_addr
2590 LDA &70
2600 STA &80
2610 LDA &71
2620 STA &81
2630 RTS
2640 :
2650 .right
2660 LDA &70
2670 CLC
2680 ADC #8
2690 STA &70
2700 BCC nh3
2710 INC &71
2720 .nh3
2730 JSR scr_addr
2740 RTS
2750 :
2760 .left
2770 LDA &70
2780 SEC
2790 SBC #8
2800 STA &70
2810 BCS nh4
2820 DEC &71
2830 .nh4
2840 JSR scr_addr
2850 RTS
2860 :
2870 .up
2880 LDX #2
2890 .loop2
2900 LDA &70
2910 AND #7
2920 BEQ at_top
2930 DEC &70
2940 .end_loop2
2950 DEX
2960 BNE loop2
2970 JSR scr_addr
2980 RTS
2990 .at_top
3000 LDA &70
3010 SEC
3020 SBC #&79
3030 STA &70
3040 LDA &71
3050 SBC #2
3060 STA &71
3070 JMP end_loop2
3080 :
3090 .down
3100 LDX #2
3110 .loop3
3120 LDA &70
3130 AND #7
3140 CMP #7
3150 BEQ at_bot
3160 INC &70
3170 .end_loop3
3180 DEX
3190 BNE loop3
3200 JSR scr_addr
3210 RTS
3220 .at_bot
3230 LDA &70
3240 CLC
3250 ADC #&79
3260 STA &70
3270 LDA &71
3280 ADC #2
3290 STA &71
3300 JMP end_loop3
3310 :
3320 .right3
3330 JSR delete
3340 JSR right
3350 LDX &72
3360 LDY &73
```

Continued ▶

◀ Castle of Nightmares listing 1 continued

```
3370 LDA #1
3380 STA &7A
3390 JMP sprite1
3400 :
3410 .left3
3420 JSR delete
3430 JSR left
3440 LDX &72
3450 LDY &73
3460 LDA #2
3470 STA &7A
3480 JMP sprite1
3490 :
3500 .cols
3510 PHP
3520 CMP #5
3530 BNE out
3540 PHA
3550 TXA
3560 PHA
3570 TYA
3580 PHA
3590 JSR setup
3600 LDA &7C
3610 CMP #1
3620 BEQ l1
3630 CMP #2
3640 BEQ l2
3650 CMP #3
3660 BEQ l3
3670 :
3680 .l1
3690 LDA #2
3700 STA &7C
3710 LDA #block1 MO
D 256
3720 STA &89
3730 LDA #block1 DI
V 256
3740 STA &8A
3750 JMP drop
3760 :
3770 .l2
3780 LDA #3
3790 STA &7C
3800 LDA #block2 MO
D 256
3810 STA &89
3820 LDA #block2 DI
V 256
3830 STA &8A
3840 JMP drop
3850 :
3860 .l3
3870 LDA #1
3880 STA &7C
3890 LDA #block3 MO
D 256
3900 STA &89
3910 LDA #block3 DI
V 256
3920 STA &8A
3930 :
3940 .drop
3950 LDY #&FF
3960 .me
3970 INY
3980 LDA (&89),Y
3990 STA p_block
4000 INY
4010 LDA (&89),Y
4020 STA p_block+1
4030 TYA
4040 PHA
4050 LDX #p_block M
OD 256
4060 LDY #p_block D
IV 256
4070 LDA #&C
4080 JSR &FFF1
4090 PLA
4100 TAY
4110 CPY #5
4120 BNE me
4130 :
4140 .aline
4150 PLA
4160 TAY
4170 PLA
4180 TAX
4190 PLA
4200 .out
4210 PLP
4220 RTS
4230 :
4240 .setup
4250 LDA #4
4260 LDX #clock MOD
256
4270 LDY #clock DIV
256
4280 JMP &FFF1
4290 :
4300 .clock
4310 ]
4320 NEXT pass
4330 :
4340 ?&220=cols MOD
256
4350 ?&221=cols DIV
256
4360 ?&7C=1
4370 !clock=&FFFFFF
F6
4380 clock?4=&FF
4390 ENDPROC
4400 :
4410 DEF PROCsprite
s
4420 FOR loop%=0 TO
95
4430 READ A$
4440 sprites%!(loop
%*4)=EVAL("&"+A$)
4450 NEXT loop%
4460 FOR loop%=1 TO
6
4470 s(loop%)=sprit
es%+(loop%-1)*64
4480 NEXT loop%
4490 ENDPROC
4500 :
4510 DEF PROCtune
4520 FOR loop%=0 TO
89
4530 READ tune%?loo
p%
4540 NEXT loop%
4550 ENDPROC
4560 :
4570 DEF PROCchecks
ums
4580 PRINT'"Calcula
ting checksums ...."
```

Continued ▶

◀ Castle of Nightmares listing 1 continued

```
4590 PROCcs(entry,delete-1,"assembler t
o label 'delete'",&8D48)
4600 PROCcs(delete,clock-1,"assembler f
rom label 'delete'",&7A47)
4610 PROCcs(sprites%,sprites%+383,"spri
tes data",&155B)
4620 PROCcs(tune%,tune%+89,"tune data",
&F1D)
4630 IF INKEY(-256)<>253 AND INKEY(-256
)<>245 THEN PROCcs(&C00,&CBF,"VDU 23 sta
tements",&26E2)
4640 PRINT'"Checksums O.K."
4650 FOR loop%=1 TO 5000:NEXT loop%
4660 ENDPROC
4670 :
4680 DEF PROCcs(start%,finish%,text$,cs
%)
4690 sum%=0
4700 FOR loop%=start% TO finish%
4710 sum%=sum%+?loop%
4720 NEXT
4730 IF sum%<>cs%:PRINT'"Checksum error
"'"Please check ";text$:END
4740 ENDPROC
4750 :
4760 DEF PROCinstr
4770 CLS
4780 PRINT'"CASTLE OF NIGHTMARES"
4790 PRINT'"by Mark de Weger"
4800 PRINT'''" Do you want to:"'
4810 PRINT"  1. Create screens"
4820 PRINT"  2. Play the game"
4830 PRINT''" Enter option: ";
4840 *FX15,1
4850 REPEAT
4860 G%=GET-48
4870 UNTIL G%=1 OR G%=2
4880 PRINT;G%
4890 IF G%=1 THEN CHAIN "NIGHTM2" ELSE
CHAIN "NIGHTM3"
4900 ENDPROC
4910 :
4920 DEF PROCchars
4930 VDU23,224,&FB00;&00FB;&DF00;&00DF;
4940 VDU23,225,&FF00;0;0;&00FF;
4950 VDU23,226,0;&4281;&1824;0;
4960 VDU23,227,0;&6600;&0066;0;
4970 VDU23,228,&0080;0;0;0;
4980 VDU23,229,&0010;0;0;0;
4990 VDU23,230,&0002;0;0;0;
5000 VDU23,231,&4242;&4242;&4242;&4242;
5010 VDU23,232,&3C00;0;&3C00;0;
5020 VDU23,233,0;&2800;&7C7C;&387C;
5030 VDU23,234,&0402;&0008;0;0;
5040 VDU23,235,0;&1800;&0018;0;
5050 VDU23,236,0;&2418;&1824;0;
5060 VDU23,237,0;&9900;&DB99;&FF7E;
5070 VDU23,238,0;&0099;0;0;
5080 VDU23,239,&AA00;&5500;&AA00;0;
5090 VDU23,240,0;&0055;&00AA;&0055;
5100 VDU23,241,0;&00AA;&0055;&00AA;
5110 VDU23,242,&120C;&040C;&0C04;&1C04;
5120 VDU23,243,&00FF;0;0;&00FF;
5130 VDU23,244,&AA00;&AAFF;&AAFF;0;
5140 VDU23,245,&1020;&3442;&1441;&0102;
5150 VDU23,246,0;&8800;&2A54;&2084;
5160 VDU23,247,&FFFF;&FFFF;&FFFF;&FFFF;
5170 ENDPROC
5180 :
5190 REM Sprites data
5200 DATA 0,0,0
5210 DATA 0,111B1B05,14140011
```

Continued ▶

◀ **Castle of Nightmares listing 1 continued**

```
5220 DATA 1111010,0,3332330F
5230 DATA 34203922,3033C34,F080203
5240 DATA 220000,0,2022828
5250 DATA 0,0,0
5260 DATA 0,0,111B1B05
5270 DATA 14140011,1011414,A0E0100
5280 DATA 3332330F,34203922,3133830
5290 DATA 5040103,220000,0
5300 DATA 2022828,A000000,110000
5310 DATA 0,1011414,0
5320 DATA 3331330F,38103611,3033C38
5330 DATA F040103,2227270A,28280022
5340 DATA 2222020,0,0
5350 DATA 0,0,0
5360 DATA 110000,0,1011414
5370 DATA 5000000,3331330F,38103611
5380 DATA 3233430,A080203,2227270A
5390 DATA 28280022,2022828,50D0200
5400 DATA 0,0,0
5410 DATA 0,0,0
5420 DATA 0,0,11270F05
5430 DATA 3C140011,1033C3C,5040101
5440 DATA 330F0F0F,3C3C2833,3033C3C
5450 DATA 5040101,220A00,28000000
5460 DATA 22828,0,3C140000
5470 DATA 14,382C3800,382C
5480 DATA 18241800,1824,39343900
5490 DATA 3934,33333300,3333
5500 DATA 30003000,3000,F0B0302
5510 DATA 2030B,3020000,2
5520 :
5530 REM Tune data
5540 DATA 81,4,81,4,89,4,89,4,81,8
5550 DATA 69,8,81,4,81,4,89,4,89,4
5560 DATA 81,8,69,8,81,4,81,4,89,4
5570 DATA 97,4,101,8,109,8,97,8,89,2
5580 DATA 97,4,89,2,81,8,89,4,97,4
5590 DATA 101,8,97,4,89,4,81,16,89,8
5600 DATA 81,4,73,4,69,12,73,4,81,4
5610 DATA 81,4,53,4,73,4,69,8,61,8
5620 DATA 53,16,53,4,53,4,53,4,53,4
```

Listing 2. The screen designer program

```
10 REM Castle of Nightmares Listing 2
20 REM By Mark de Weger
30 REM BBC B/B+/M/C/E
40 REM (c) Acorn User December 1986
50 :
60 *FX 13,5
70 MODE 1
80 ON ERROR GOTO 2000
90 PROCstart
100 MODE 2
110 CALL &165C
120 *FX 14,5
130 PROCsetup
140 IF yn$<>"N":PROCscreen ELSE $&AE1=
""
150 PROCcreate
160 END
170 :
180 DEF PROCset(x%,y%,nr%)
190 VDU 5
200 MOVE x%*64,1024-y%*32
210 GCOL 0,0
220 VDU 247,8
230 ON nr%+1 GOSUB 270,290,300,330,410
,490,530,560,590,620,650
240 VDU 4
250 ENDPROC
```

Continued ▶

◀ **Castle of Nightmares listing 2 continued**

```
260 :
270 RETURN
280 :
290 GCOL 3,1:VDU 224:RETURN
300 GCOL 3,4:VDU 225,8:GCOL 3,3
310 VDU 226:RETURN
320 :
330 GCOL 3,6:VDU 225,8:GCOL 3,4
340 VDU 227,8:GCOL 3,8:VDU 228,8
350 GCOL 3,9:VDU 229,8:GCOL 3,10
360 VDU 230,8:PLOT 0,0,-28
370 GCOL 3,10:VDU 228,8:GCOL 3,9
380 VDU 229,8:GCOL 3,8:VDU 230
390 RETURN
400 :
410 GCOL 3,6:VDU 225,8:GCOL 3,4
420 VDU 227,8:GCOL 3,10:VDU 228,8
430 GCOL 3,9:VDU 229,8:GCOL 3,8
440 VDU 230,8:PLOT 0,0,-28
450 GCOL 3,8:VDU 228,8:GCOL 3,9
460 VDU 229,8:GCOL 3,10:VDU 230,8
470 RETURN
480 :
490 GCOL 3,8:VDU 239,8:GCOL 3,9
500 VDU 240,8:GCOL 3,10:VDU 241
510 RETURN
520 :
530 GCOL 3,7:VDU 231,8:GCOL 3,6
540 VDU 232:RETURN
550 :
560 GCOL 3,5:VDU 233,8:GCOL 3,2
570 VDU 234:RETURN
580 :
590 GCOL 3,4:VDU 235,8:GCOL 3,3
600 VDU 236:RETURN
610 :
620 GCOL 3,1:VDU 237,8:GCOL 3,12
630 VDU 238:RETURN
640 :
650 GCOL 3,2:VDU 242:RETURN
660 :
670 DEF PROCsetup
680 FOR loop%=0 TO 9
690 PROCset(loop%*2,1,loop%+1)
700 PRINT TAB(loop%*2,2);loop%
710 NEXT
720 ENDPROC
730 :
740 DEF PROCstart
750 yn$=FNyn("Load screen from tape/di
sc? (Y/N) ")
760 IF yn$="N":FOR loop%=&900 TO &AFC
STEP 4:!loop%=0:NEXT:ENDPROC
770 *CAT
780 REPEAT
790 fn$=FNfilename
800 ch%=OPENUP("S."+fn$)
810 CLOSE #0
820 IF ch%=0:VDU7
830 UNTIL ch%
840 PROCoscli("LOAD S."+fn$+" 900")
850 ENDPROC
860 :
870 DEF PROCpoke(x%,y%,nr%)
880 ?(&900+x%+(y%-5)*20)=nr%
890 ENDPROC
900 :
910 DEF PROCscreen
920 PRINT TAB(0,0);
930 FOR y%=5 TO 28
940 FOR x%=0 TO 20
950 PROCset(x%,y%,?(&900+x%+(y%-5)*20)
)
960 NEXT
```

Continued ▶

◀ Castle of Nightmares listing 2 continued

```
 970 NEXT
 980 ENDPROC
 990 :
1000 DEF PROCcreate
1010 PROCset(0,28,1)
1020 PROCset(0,5,2)
1030 PROCset(1,5,2)
1040 PROCpoke(0,28,1)
1050 PROCpoke(0,5,2)
1060 PROCpoke(1,5,2)
1070 FOR y%=4 TO 25 STEP 3
1080 ?&84=8
1090 !&76=&3240+y%*&280
1100 CALL &14E7
1110 VDU 5
1120 MOVE 1176,1030-(y%+1)*32
1130 GCOL 0,7
1140 VDU 243,8
1150 GCOL 0,3
1160 VDU 244
1170 NEXT
1180 VDU 4
1190 FOR x%=0 TO 2
1200 !&70=&7880+x%*32
1210 !&72=&1200
1220 CALL &154E
1230 NEXT x%
1240 PROCbox(56,864,115,936,2)
1250 PROCbox(74,910,102,930,0)
1260 PLOT 69,98,896
1270 PROC3d(8,30,2,3,$&AE1)
1280 prev%=-15
1290 nx%=1
1300 ny%=28
1310 REPEAT
1320 PRINT TAB(nx%,ny%);
1330 key$=GET$
1340 IF ASC(key$)=13:key$=CHR$(prev%+47)
1350 IF key$>="0" AND key$<="9":prev%=VAL(key$)+1:PROCset(nx%,ny%,prev%):PROCpoke(nx%,ny%,prev%):UNTIL 0
1360 IF key$=" ":PROCset(nx%,ny%,0):PROCpoke(nx%,ny%,0):prev%=-15
1370 ox%=nx%+(key$="Z")-(key$="X")
1380 oy%=ny%+(key$=":")-(key$="/")
1390 IF ox%<0 OR ox%>16 OR oy%<5 OR oy%>28 OR (ox%=0 AND oy%=28) OR (ox%<2 AND oy%=5):UNTIL 0
1400 nx%=ox%
1410 ny%=oy%
1420 UNTIL 0
1430 :
1440 DEF PROCoscli($&BA0)
1450 X%=&A0
1460 Y%=&B
1470 CALL &FFF7
1480 ENDPROC
1490 :
1500 DEF PROCbox(a%,b%,c%,d%,nr%)
1510 VDU 24,a%;b%;c%;d%;
1520 GCOL 0,128+nr%
1530 CLG
1540 GCOL 0,7
1550 GCOL 0,128
1560 MOVE a%,b%
1570 DRAW a%,d%
1580 DRAW c%,d%
1590 DRAW c%,b%
1600 IF nr%<>2:DRAW a%,b%
1610 VDU 26
1620 ENDPROC
1630 :
```

Continued ▶

◀ Castle of Nightmares listing 2 continued

```
1640 DEF PROC3d(x%,y%,c1%,c2%,text$)
1650 VDU 5
1660 MOVE x%*64,1024-y%*32
1670 GCOL 0,c1%
1680 PRINT text$
1690 MOVE x%*64-4,1022-y%*32-2
1700 GCOL 0,c2%
1710 PRINT text$
1720 VDU 4
1730 ENDPROC
1740 :
1750 DEF FNyn(text$)
1760 COLOUR 1
1770 PRINT'text$;
1780 COLOUR 2
1790 *FX 15,1
1800 REPEAT
1810 yn$=GET$
1820 UNTIL INSTR("YN",yn$)
1830 PRINT yn$'
1840 COLOUR 3
1850 =yn$
1860 :
1870 DEF FNfilename
1880 COLOUR 1
1890 PRINT''"Enter filename: ";
1900 COLOUR 2
1910 PRINT"S.";
1920 REPEAT
1930 fn$=GET$
1940 UNTIL fn$>="A" AND fn$<="Z"
1950 PRINT fn$
1960 COLOUR 3
1970 =fn$
1980 :
1990 REM Error trapping routine
2000 *FX 13,5
2010 MODE 1
2020 IF ERR<>17:PRINT:REPORT:PRINT'
2030 yn$=FNyn("Save screen to tape/disc? (Y/N) ")
2040 IF yn$="N":GOTO 2220
2050 COLOUR 1
2060 PRINT''"Old title: ";
2070 COLOUR 2
2080 PRINT $&AE1
2090 COLOUR 1
2100 REPEAT
2110 PRINT"Enter new title (<RETURN>: same)"'
2120 COLOUR 2
2130 INPUT""title$
2140 IF LEN(title$)>10:VDU7
2150 UNTIL LEN(title$)<=10
2160 IF title$<>"":$&AE1=title$
2170 COLOUR 3
2180 CLS
2190 *CAT
2200 fn$=FNfilename
2210 PROCoscli("SAVE S."+fn$+" 900 +1FF")
2220 yn$=FNyn("Create/edit another screen? (Y/N) ")
2230 IF yn$="Y":RUN
2240 *FX 13,5
2250 MODE 6
2260 CHAIN "NIGHTM1"
```

Listing 3. The Castle of Nightmares game

```
     1 REM Castle of Nightmares  Listing 3
     2 REM by Mark de Weger
     3 REM for BBC B/B+/M/C/E
     4 REM (c) Acorn User December 1986
     5 :
     6 REM Don't type in lines 1 to 7!
     7 :
    10 P%=&1400:Z%=&154E:Q%=&14E7:O%=&1390
:I%=0:I$="The Master":t%=0:ON ERROR GOTO1
100
    20 S%=0:G%=7000:F%=0:PROCo("FX13,5"):M
ODE2:VDU23;8202;0;0;0;:H%=3:CALL &165C:*F
X14,5
    30 K%=0:PROCe
    40 J%=0:B%=0:T%=-2:C%=0:D%=0:!&70=&710
0:!&72=&1200:CALL Z%:!&76=&6940:?&84=8:M%
=40:N%=7
    50 REPEAT
    60 IF INKEY-74:PROCj:GOTO120
    70 IF INKEY-98:PROCl:GOTO120
    80 IF INKEY-67:PROCr:GOTO120
    90 IF INKEY-73:PROCu:GOTO120
   100 IF INKEY-105:PROCd:GOTO120
   110 IF INKEY-106:PROCg
   120 PROCc(C%,D%):PROCm:UNTIL B% OR J%
   130 PROCo("FX15"):IF B%:GOTO150
   140 F%=F%+100+R%*10:PROCp(1000):SOUND0,
-10,4,50:FOR L%=1 TO 33:PRINTTAB(0,31):PR
OCp(100):NEXT:CLS:GOTO30
   150 PROCp(1000):H%=H%-1:IF H%=-1:GOTO 1
70
   160 FOR L%=32 TO 0 STEP -1:PRINTTAB(0,3
2-L%);SPC(20):SOUND1,-15,L%*3,1:PROCp(30)
:NEXT:CLS:PROCz:GOTO40
   170 IF F%<=I%:GOTO190 ELSE PROCb(256,30
0,1040,724,0):I%=F%:PROCv(6,11,4,3,"Hi-sc
ore!"):PROCv(5,13,2,1,"Enter name:"):VDU2
8,5,15,15,15
   180 INPUT""I$:IF LEN(I$)>10:VDU7:CLS:GO
TO180
   190 VDU26:PROCb(256,300,1040,724,0):PRO
Cv(6,11,4,2,"Hi-score:")
   200 PRINTTAB(7,13);STRING$(6-LEN(STR$(I
%)),"0");I%;TAB(5,17);SPC((10-LEN(I$))/2)
;I$:PROCv(9,15,3,1,"by"):PROCv(5,20,3,5,"
Press SPACE")
   210 PROCo("FX15"):REPEAT:UNTIL GET=32:G
OTO20
   220 DEFPROCl:IF C%=0 OR D%/2<>INT(D%/2)
:ENDPROC ELSE C%=C%-1:IF ADVAL-5=15:SOUND
0,-11,2,1
   230 A%=4:CALL P%:PROCm:A%=3:CALL P%:END
PROC
   240 DEFPROCr:IF C%=32 OR D%/2<>INT(D%/2
):ENDPROC ELSE C%=C%+1:IF ADVAL-5=15:SOUN
D0,-11,2,1
   250 A%=2:CALL P%:PROCm:A%=1:CALL P%:END
PROC
   260 DEFPROCu:IF D%=46 OR NOT(FNw(C%,D%+
2)=6 OR FNw(C%,D%+1)=6):ENDPROC ELSE D%=D
%+1:IF ADVAL-5=15:SOUND0,-11,2,1
   270 A%=5:CALL P%:PROCm:A%=5:CALL P%:END
PROC
   280 DEFPROCd:IF D%=0 OR NOT(FNw(C%,D%)=
6 OR FNw(C%,D%+1)=6):ENDPROC ELSE D%=D%-1
:IF ADVAL-5=15:SOUND0,-11,2,1
   290 A%=10:CALL P%:PROCm:A%=10:CALL P%:E
NDPROC
   300 DEFPROCp(A%):FOR x=1 TO A%:NEXT:END
PROC
```

Continued ▶

◀ Castle of Nightmare listing 3 continued

```
   310 DEFPROCj:IF NOT INKEY-67 OR C%>30:G
OTO350 ELSE IF D%/2<>INT(D%/2):ENDPROC
   320 IF ADVAL-5=15:SOUND0,-11,2,1
   330 FOR L%=1 TO 2:A%=6:CALL P%:A%=6:CAL
L P%:C%=C%+1:D%=D%+1:PROCm:NEXT:IF C%=32:
ENDPROC ELSE A%=FNw(C%,D%):IF A%>0 AND A%
<7:ENDPROC
   340 C%=C%+1:A%=1:CALL P%:A%=1:CALL P%:P
ROCm:A%=FNw(C%,D%):IF C%>30 OR (A%>0AND A
%<7):ENDPROC ELSE FOR L%=1 TO 2:A%=11:CAL
L P%:A%=11:CALL P%:C%=C%+1:D%=D%-1:PROCm:
NEXT:ENDPROC
   350 IF NOT INKEY-98 OR C%<2:GOTO390 ELS
E IF D%/2<>INT(D%/2):ENDPROC
   360 IF ADVAL-5=15:SOUND0,-11,2,1
   370 FOR L%=1 TO 2:A%=7:CALL P%:A%=7:CAL
L P%:C%=C%-1:D%=D%+1:PROCm:NEXT:IF C%=0:E
NDPROC ELSE A%=FNw(C%,D%):IF A%>0 AND A%<
7:ENDPROC
   380 C%=C%-1:A%=3:CALL P%:A%=3:CALL P%:P
ROCm:A%=FNw(C%,D%):IF C%<2 OR (A%>0AND A%
<7):ENDPROC ELSE FOR L%=1 TO 2:A%=12:CALL
 P%:A%=12:CALL P%:C%=C%-1:D%=D%-1:PROCm:N
EXT:ENDPROC
   390 A%=?&7A:IF A%=1:V%=8:W%=13:GOTO 410
:ELSE IF A%=2:V%=9:W%=14:GOTO410
   400 V%=5:W%=10
   410 IF ADVAL-5=15:SOUND0,-11,2,1
   420 FOR L%=1 TO 2:A%=V%:CALL P%:A%=V%:C
ALL P%:D%=D%+1:PROCm:NEXT:A%=FNw(C%,D%):X
%=FNw(C%-1,D%):Y%=FNw(C%+1,D%):IF (A%>0 A
ND A%<7) OR (X%>0 AND X%<6) OR (Y%>0 AND
Y%<6):ENDPROC
   430 FOR L%=1 TO 2:A%=W%:CALL P%:A%=W%:C
ALL P%:D%=D%-1:PROCm:NEXT:ENDPROC
   440 DEFPROCm:PROCn:IF ADVAL-6<5 OR t%:G
OTO460 ELSE T%=T%+2:IF T%=90:T%=0
   450 SOUND1,1,T%?O%,O%?(T%+1):SOUND3,1,T
%?O%,O%?(T%+1)
   460 IF M%>6:GOTO510 ELSE M%=M%-1:IF M%=
5:?&84=8:CALL Q%:!&76=&3240+(29-N%)*&280:
?&84=8:CALL Q%:ENDPROC
   470 IF M%<>4:GOTO 500
   480 y%=29-((INT(D%/6)+RND(3)-2)*3+1):IF
 y%<4:y%=4 ELSE IF y%>25:y%=25
   490 N%=29-y%:!&76=&3240+y%*&280:ENDPROC
   500 IF M%=2 OR M%=3:?&84=8:CALL Q%:ENDP
ROC ELSE IF M%=1:M%=41:ENDPROC
   510 M%=M%-1:A%=15:CALL P%:IF D%-N%*2<-2
:IF D%-N%*2>-8:IF M%-C%<7:IF M%-C%>4:PROC
k(1)
   520 ENDPROC
   530 DEFPROCe:S%=S%+1:A%=OPENUP("S."+CHR
$(S%+64)):CLOSE#0:IF A%=0:S%=1:G%=G%-1000
   540 PROCo("LOAD S."+CHR$(S%+64)+" 900")
:PROCz:ENDPROC
   550 DEFPROCs(x%,y%,W%):VDU5:MOVE x%*64,
1024-y%*32:ON W%+1 GOSUB 570,580,590,600,
610,620,630,640,650,660,670
   560 VDU4:ENDPROC
   570 RETURN
   580 GCOL3,1:VDU224:RETURN
   590 GCOL3,4:VDU225,8:GCOL3,3:VDU226:RET
URN
   600 GCOL3,6:VDU225,8:GCOL3,4:VDU227,8:G
COL3,8:VDU228,8:GCOL3,9:VDU229,8:GCOL3,10
:VDU230,8:PLOT0,0,-28:GCOL3,10:VDU228,8:G
COL3,9:VDU229,8:GCOL3,8:VDU230:RETURN
```

Continued ▶

◀ **Castle of Nightmares listing 3 continued**

```
  610 GCOL3,6:VDU225,8:GCOL3,4:VDU227,8:G
COL3,10:VDU228,8:GCOL3,9:VDU229,8:GCOL3,8
:VDU230,8:PLOT0,0,-28:GCOL3,8:VDU228,8:GC
OL3,9:VDU229,8:GCOL3,10:VDU230,8:RETURN
  620 GCOL3,8:VDU239,8:GCOL3,9:VDU240,8:G
COL3,10:VDU241:RETURN
  630 GCOL3,7:VDU231,8:GCOL3,6:VDU232:RET
URN
  640 GCOL3,5:VDU233,8:GCOL3,2:VDU234:RET
URN
  650 GCOL3,4:VDU235,8:GCOL3,3:VDU236:RET
URN
  660 GCOL3,1:VDU237,8:GCOL3,12:VDU238:RE
TURN
  670 GCOL3,2:VDU242:RETURN
  680 DEFPROCa(x%,y%,W%):?(&900+x%+(y%-5)
*20)=W%:ENDPROC
  690 DEFPROCz:PRINTTAB(0,0);:FOR y%=5 TO
 28:FOR x%=0 TO 20:PROCs(x%,y%,?(&900+x%+
(y%-5)*20)):NEXT:NEXT
  700 FOR y%=4 TO 25 STEP 3:?&84=8:!&76=&
3240+y%*&280:CALL &14E7:VDU5:MOVE 1176,10
30-(y%+1)*32:GCOL0,7:VDU243,8:GCOL0,3:VDU
244:NEXT:VDU4
  710 IF H%<>0:FOR x%=0 TO H%-1:!&70=&788
0+x%*32:!&72=&1200:CALL &154E:NEXT
  720 PROCb(56,864,115,936,2):PROCb(74,91
0,102,930,0):PLOT69,98,896:PROCv(8,30,2,3
,$&AE1):PROCv(0,1,4,5,"SCORE:"):PROCv(13,
1,4,5,"TIME:"):IF K%>3:K%=3
  730 IF K%<>0:FOR L%=1 TO K%:COLOUR2:PRI
NTTAB(3+L%,30);CHR$242;:COLOUR7:NEXT
  740 TIME=0:PROCn:ENDPROC
  750 DEFPROCo($&BA0):X%=&A0:Y%=&B:CALL &
FFF7:ENDPROC
  760 DEFPROCb(U%,V%,X%,Y%,W%):VDU24,U%;V
%;X%;Y%;:GCOL0,128+W%:CLG:GCOL0,7:GCOL0,1
28:MOVE U%,V%:DRAW U%,Y%:DRAW X%,Y%:DRAW
X%,V%:IF W%<>2:DRAW U%,V%
  770 VDU26:ENDPROC
  780 DEFPROCv(x%,y%,X%,Y%,t$):VDU5:MOVE
x%*64,1024-y%*32:GCOL0,X%:PRINTt$:MOVE x%
*64-4,1022-y%*32-2:GCOL0,Y%:PRINTt$:VDU4:
ENDPROC
  790 DEFPROCn:R%=(G%-TIME)/100:PRINTTAB(
6,1);STRING$(6-LEN(STR$(F%)),"0");F%;TAB(
18,1);STRING$(2-LEN(STR$(R%)),"0");R%:END
PROC
  800 DEFFNw(x%,y%):x=x%*.5:y=28-y%*.5:IF
 x<>INT(x):=-1 ELSE IF y<5:=0
  810 IF y%*.5<>INT(y%*.5):=-2 ELSE =?(&9
00+x+(y-5)*20)
  820 DEFPROCc(x%,y%):IF C%<4:IF D%>45:IF
 K%>2:J%=-1:ENDPROC
  830 IF TIME>G%:TIME=G%-99:PROCn:PROCk(2
):ENDPROC ELSE E%=FNw(x%,y%+2):IF E%=7:F%
=F%+50:PROCa(x,y,0):PROCs(x,y,7):SOUND0,3
,10,10
  840 IF E%=8:TIME=0:PROCa(x,y,0):PROCs(x
,y,8):SOUND&0002,4,25,10 ELSE IF E%=9:PRO
Ck(2):ENDPROC
  850 IF E%=10:PROCf
  860 E%=FNw(x%,y%)
  870 IF E%=1 OR E%=2 OR E%=6:ENDPROC ELS
E IF E%=0 OR E%>6:PROCt:ENDPROC
  880 IF E%=-2:ENDPROC
  890 IF E%=4:IF C%<>32:CALL &15CF:CALL &
15CF:C%=C%+1 ELSE IF E%=3:IF C%<>0:CALL &
15E0:CALL &15E0:C%=C%-1
  900 IF E%=5:SOUND&0002,1,200,5:PROCa(x,
y,0):PROCs(x,y,5):F%=F%+10
```

Continued ▶

◀ **Castle of Nightmares listing 3 continued**

```
  910 E%=FNw(x%+1,y%)
  920 IF E%<>3 AND E%<>4:E%=FNw(x%-1,y%):
IF E%<>3 AND E%<>4 AND E%<>0 AND E%<7:END
PROC ELSE IF E%=4:IF C%<>32:CALL &15CF:CA
LL &15CF:C%=C%+1
  930 IF E%=3:IF C%<>0:CALL &15E0:CALL &1
5E0:C%=C%-1 ELSE IF E%=0 OR E%>6:E%=FNw(x
%+1,y%):IF E%=0 OR E%>6:PROCt
  940 ENDPROC
  950 DEFPROCf:K%=K%+1:IF K%<4:COLOUR2:PR
INTTAB(3+K%,30);CHR$242;:COLOUR7:F%=F%+10
0:SOUND2,2,200,1
  960 PROCa(x,y,0):PROCs(x,y,10):ENDPROC
  970 DEFPROCt:A%=?&7A:IF A%=1:V%=13:GOTO
 990 ELSE IF A%=2:V%=14:GOTO990
  980 V%=10
  990 U%=D%:REPEAT:FOR L%=1 TO 2:D%=D%-1:
A%=V%:CALL P%:PROCm:A%=V%:CALL P%:NEXT:A%
=FNw(C%,D%):UNTIL A%>0 OR (A%=-1 AND (FNw
(C%-1,D%)>0 OR FNw(C%+1,D%)>0)) OR D%<0
 1000 IF U%-D%>4:PROCk(3) ELSE IF D%<0:PR
OCk(2)
 1010 ENDPROC
 1020 DEFPROCk(U%):PROCo("FX15"):IF B%=-1
:ENDPROC ELSE B%=-1
 1030 IF U%=1:SOUND&10,3,6,1:VDU5:FOR U%=
1 TO 15:GCOL0,RND(7):MOVE C%*32+((RND(3)-
2)*RND(75))-12,D%*16+RND(50)+150:VDU245,2
46:NEXT:VDU4:GCOL0,7:ENDPROC
 1040 IF U%=3:SOUND&10,3,100,1:PRINTTAB(0
,0);CHR$11;:PROCp(1000):PRINTTAB(0,31):EN
DPROC
 1050 IF U%=2:FOR U%=1 TO 20:SOUND&03,1,(
U% MOD 2)*50+100,1:A%=1:CALL P%:PROCp(10)
:A%=3:CALL P%:PROCp(10):NEXT:PROCo("FX15"
):SOUND0,-15,6,2:CALL Z%:PROCp(500):ENDPR
OC
 1060 DEFPROCg:U%=TIME:PROCo("FX15"):REPE
AT:IF INKEY-17:*FX210,1
 1070 IF INKEY-82:*FX210
 1080 IF INKEY-36:t%=0 ELSE IF INKEY-55:t
%=1
 1090 UNTIL INKEY-90:TIME=U%:ENDPROC
 1100 PROCo("FX15"):CLOSE#0:IF INKEY-2:PR
OCo("FX13,5"):MODE6:CHAIN"NIGHTM1" ELSE 1
70
```

Listing 4. Sets up three games screens

```
   10 REM Castle of Nightmares Listing 4
   20 REM By David Lawrence
   30 REM For BBC B/B+/M/C/E
   40 REM (C) Acorn User December 1986
   50 :
   60 MODE 6
   70 PRINT'SPC(7)"Castle of Nightmares"
'''
   80 screen%=65:DIM os 100
   90 REPEAT
  100 FOR I%=&900 TO &AFC STEP 4
  110 !I%=0:NEXT
  120 addr%=&900
  130 READ name$:$&AE1=name$
  140 PRINT"Creating :";name$
  150 REPEAT
  160 READ A$
  170 IF A$<>"*" PROCpoke(A$)
  180 UNTIL A$="*"
  190 READ check
```

Continued ▶

◄ Castle of Nightmares listing 4 continued

```
 200 T%=0:FOR I%=&900 TO &AFF
 210 T%=T%+?I%:NEXT
 220 IF T%<>check PRINT"Please check da
ta for '";name$;"'.":VDU7:END
 230 PROCoscli("*SAVE S."+CHR$(screen%)
+" 900+1FF")
 240 screen%=screen%+1:UNTIL screen%=68
 250 PRINT'"Screens completed.":VDU 7
 260 END
 270 :
 280 DEF PROCpoke(S$)
 290 REPEAT
 300 B$=LEFT$(S$,1)
 310 IF B$<"A" ?addr%=ASC(B$)-47:addr%=
addr%+1
 320 IF B$>="A" FOR M%=0 TO ASC(B$)-65:
M%?addr%=0:NEXT:addr%=addr%+M%
 330 S$=MID$(S$,2):UNTILS$=""
 340 ENDPROC
 350 :
 360 DEF PROCoscli(os$)
 370 $os=os$
 380 X%=os MOD 256:Y%=os DIV 256
 390 CALL &FFF7
 400 ENDPROC
 410 :
 420 DATA THE ENTRY
 430 DATA 111111511111111A6J5F0005I5I5I5
 440 DATA D9D5C454440005221B8A5D5F5B115
 450 DATA 111D5F5D5F95B6C5D5F11B151A1D5
 460 DATA 6J5G115I5I5G6A5D6D5E500000B40
 470 DATA 05B59D5J53344D5J5H5J5H5J5H5J5
 480 DATA H11533333B1115H5J5H5J5H5J5H5E
 490 DATA 8D5A6C000044400004440000D
 500 DATA *,1247
 510 DATA FAIRY LAIR
 520 DATA 11115I666G5H5111F65C7D5H54111
 530 DATA 4441A95H5G111445E5B6J5E00000
 540 DATA 09G5J00F00K00B8A00M005000P5S5
 550 DATA K6A8E5H5221111222213333C505C
 560 DATA 505C505C56I9B6A5C114411514411
 570 DATA 11115I5I5I5I5I5G6A5D8A6B5C0
 580 DATA 0000000B000000D
 590 DATA *,1251
 600 DATA DEATH ROOM
 610 DATA 1115A6A5D66566F51115D11511F5C
 620 DATA 5F5H5C5F5H5C59C7A5H5B511B0005
 630 DATA H5B5G5A9F5B5G544D6A5B5G5F5111
 640 DATA 55G5F5C55G5F5C5112222525F5C5F
 650 DATA 5H5C5F5H5A6A5F5H5111 5A6B8A5H5
 660 DATA C55144111 15F5C55G5F5C55G5F5C5
 670 DATA 5G533D5C55G5F5C55G5F5B655B8A6
 680 DATA 9A5E0000000000000000D
 690 DATA *,1433
```

See DIY Windows, page 95

Listing 1. Assembles main Windows code

```
  10 REM Windows - Listing 1
  20 REM by David Lawrence
  30 REM for BBC B/B+/M/C/E
  40 REM (C) Acorn User December 1986
  50 :
  60 MODE 6
  70 PROCvars
  80 PROCassemble
  90 PROCchecksum
 100 PROCsave
 110 END
 120 :
 130 DEF PROCvars
 140 left=&70:bottom=&71:right=&72
 150 top=&73:coords=&70:width=&74
```

Continued ►

◄ Windows listing 1 continued

```
 160 rom=&75:count=&76:left1=&77
 170 coords2=&77:slot=&7B:flag=&7F
 180 point1lo=&80:point1hi=&81
 190 point1=&80:point2lo=&82
 200 point2hi=&83:swrlo=&84:swrmem=&84
 210 swrhi=&85:copylo=&86:copyhi=&87
 220 fore=&88:back=&89:temp1=&8E
 230 temp2=&8F:latch=&FE30:RAMcopy=&F4
 240 wind=&302:textl=&308:textt=&30B
 250 Xpos=&318:Ypos=&319:byteschar=&34F
 260 TLHClo=&350:TLHChi=&351
 270 bytesrowlo=&352:bytesrowhi=&353
 280 forecol=&357:backcol=&358
 290 oswrch=&FFEE
 300 ENDPROC
 310 :
 320 DEF PROCassemble
 330 FOR pass=0 TO 3 STEP 3
```

```
 340 P%=&900
 350 [OPT pass
 360 .close
 370 LDA RAMcopy
 380 STA rom
 390 LDA slot
 400 STA latch
 410 STA RAMcopy
 420 LDA swrlo
 430 SEC
 440 SBC #14
 450 STA swrlo
 460 LDA swrhi
 470 SBC #0
 480 STA swrhi
 490 LDY #0
 500 .aloop
 510 LDA (swrmem),Y
 520 STA coords,Y
 530 INY
 540 CPY #4
 550 BNE aloop
 560 LDA (swrmem),Y
 570 STA temp1
 580 INY
 590 LDA (swrmem),Y
 600 STA temp2
 610 INY
 620 LDA #28
 630 JSR oswrch
 640 .nloop
 650 LDA (swrmem),Y
 660 JSR oswrch
 670 INY
 680 CPY #10
 690 BNE nloop
 700 LDA #31
 710 JSR oswrch
 720 LDA (swrmem),Y
 730 SEC
 740 SBC textl
 750 JSR oswrch
 760 INY
 770 LDA (swrmem),Y
 780 SEC
 790 SBC textt
 800 JSR oswrch
 810 INY
 820 LDX #0
 830 .coloop1
 840 LDA #17
 850 JSR oswrch
 860 TXA
 870 JSR oswrch
 880 INX
 890 LDA forecol
 900 CMP (swrmem),Y
 910 BNE coloop1
 920 INY
 930 LDX #128
 940 .coloop2
 950 LDA #17
 960 JSR oswrch
 970 TXA
 980 JSR oswrch
 990 INX
1000 LDA backcol
1010 CMP (swrmem),Y
1020 BNE coloop2
1030 LDA temp1
1040 STA swrlo
1050 STA copylo
1060 LDA temp2
1070 STA swrhi
1080 STA copyhi
1090 LDA #0
1100 STA flag
1110 JMP go
1120 \
1130 .open
1140 LDA RAMcopy
1150 STA rom
1160 LDA slot
1170 STA latch
1180 STA RAMcopy
1190 LDY #0
1200 .sloop
1210 LDA coords,Y
1220 STA coords2,Y
1230 INY
1240 CPY #4
1250 BNE sloop
1260 LDA #1
1270 STA flag
1280 \
1290 .go
1300 LDA right
1310 SEC
1320 SBC left
1330 STA width
1340 INC width
1350 INC bottom
1360 INC right
```

Continued ►

◀ Windows listing 1 continued

```
1370 LDA TLHClo
1380 STA point1lo
1390 LDA TLHChi
1400 STA point1hi
1410 LDY top
1420 CPY #0
1430 BEQ next1
1440 .loop1
1450 LDA point1lo
1460 CLC
1470 ADC bytesrowlo
1480 STA point1lo
1490 LDA point1hi
1500 ADC bytesrowhi
1510 STA point1hi
1520 DEY
1530 BNE loop1
1540 .next1
1550 LDY left
1560 CPY #0
1570 BEQ next2
1580 .loop2
1590 LDA point1lo
1600 CLC
1610 ADC byteschar
1620 STA point1lo
1630 LDA point1hi
1640 ADC #0
1650 STA point1hi
1660 DEY
1670 BNE loop2
1680 .next2
1690 LDA point1lo
1700 STA point2lo
1710 LDA point1hi
1720 STA point2hi
1730 LDA swrlo
1740 STA copylo
1750 LDA swrhi
1760 STA copyhi
1770 LDY #0
1780 .yloop
1790 LDA left
1800 STA count
1810 .xloop
1820 LDX byteschar
1830 .cloop
1840 LDA flag
1850 BEQ get
1860 LDA (point1),Y
1870 STA (swrmem),Y
1880 JMP cont
1890 .get
1900 LDA (swrmem),Y
1910 STA (point1),Y
1920 .cont
1930 LDA point1lo
1940 CLC
1950 ADC #1
1960 STA point1lo
1970 LDA point1hi
1980 ADC #0
1990 STA point1hi
2000 LDA swrlo
2010 CLC
2020 ADC #1
2030 STA swrlo
2040 LDA swrhi
2050 ADC #0
2060 STA swrhi
2070 DEX
2080 BNE cloop
2090 INC count
2100 LDA count
2110 CMP right
2120 BNE xloop
2130 LDA point2lo
2140 CLC
2150 ADC bytesrowlo
2160 STA point2lo
2170 STA point1lo
2180 LDA point2hi
2190 ADC bytesrowhi
2200 STA point2hi
2210 STA point1hi
2220 INC top
2230 LDA top
2240 CMP bottom
2250 BNE yloop
2260 LDA flag
2270 BEQ endc
2280 LDY #0
2290 .bloop
2300 LDA coords2,Y
2310 STA (swrmem),Y
2320 INY
2330 CPY #4
2340 BNE bloop
2350 LDA copylo
2360 STA (swrmem),Y
2370 INY
2380 LDA copyhi
2390 STA (swrmem),Y
2400 INY
2410 .wloop
2420 LDA wind,Y
2430 STA (swrmem),Y
2440 INY
2450 CPY #10
2460 BNE wloop
2470 LDA Xpos
2480 STA (swrmem),Y
2490 INY
2500 LDA Ypos
2510 STA (swrmem),Y
2520 INY
2530 LDA forecol
2540 STA (swrmem),Y
2550 INY
2560 LDA backcol
2570 STA (swrmem),Y
2580 LDA swrlo
2590 CLC
2600 ADC #14
2610 STA swrlo
2620 LDA swrhi
2630 ADC #0
2640 STA swrhi
2650 LDA #28
2660 JSR oswrch
2670 LDY #0
2680 .vloop
2690 LDA coords2,Y
2700 JSR oswrch
2710 INY
2720 CPY #4
2730 BNE vloop
2740 LDA #17
2750 JSR oswrch
2760 LDA fore
2770 JSR oswrch
2780 LDA #17
2790 JSR oswrch
2800 LDA back
2810 CLC
```

◀ Windows listing 1 continued

```
2820 ADC #128
2830 JSR oswrch
2840 LDA #12
2850 JSR oswrch
2860 LDA rom
2870 STA latch
2880 STA RAMcopy
2890 RTS
2900 :
2910 .endc
2920 LDA copylo
2930 STA swrlo
2940 LDA copyhi
2950 STA swrhi
2960 LDA rom
2970 STA latch
2980 STA RAMcopy
2990 RTS
3000 ]
3010 NEXT
3020 ENDPROC
3030 :
```

Windows listing 1 continued

```
3040 DEF PROCchecksum
3050 IF P%<>&AE8 PRINT"Assembly error!"
:VDU7:END
3060 total%=0
3070 FOR loop=&900 TO P%-1
3080 total%=total%+?loop
3090 NEXT
3100 IF total%<> 65377 PRINT"Checksum e
rror!":VDU7:END
3110 ENDPROC
3120 :
3130 DEF PROCsave
3140 PRINT''"close=&";~close;", open=&"
;~open
3150 PRINT'"Press <SPACE> to save ";
3160 REPEAT:a%=GET:UNTILa%=32
3170 *SAVE "WINDOW" 900 B00
3180 ENDPROC
```

Listing 2. Sample Windows procedure

```
  10 REM Windows - Listing 2
  20 REM by David Lawrence
  30 REM for BBC B/B+/M/C/E
  40 REM (C) Acorn User December 1986
  50 :
  60 DEF PROCinit
  70 start=&8000:end=&C000
  80 open=&990:close=&900
  90 slot=4
 100 *LOAD WINDOW
 110 ?&7B=slot
 120 ?&84=start MOD 256
 130 ?&85=start DIV 256
 140 ENDPROC
 150 :
 160 DEF PROCopen(L,B,R,T,f,b)
 170 IF(?&84+256*?&85)+?&34F*((R-L+1)*(
B-T+1))>end PRINT"Not enough RAM":END
 180 ?&70=L:?&71=B:?&72=R:?&73=T
 190 ?&88=f:?&89=b
 200 CALLopen
 210 ENDPROC
 220 :
 230 DEF PROCclose
 240 IF?&84+256*?&85=start PRINT"No Win
dows open":END
 250 CALLclose
 260 ENDPROC
```

Listing 3. Windows demo program

```
 10 REM Windows- Listing 3
 20 REM by David Lawrence
 30 REM for BBC B/B+/M/C
 40 REM (C) Acorn User December 1986
 50 :
 60 MODE1:VDU23;8202;0;0;0;
 70 PROCinit
 80 FORI%=1TO200:GCOL0,RND(4)-1
 90 DRAWRND(1280),RND(1024):NEXT
100 FORI%=0TO3
110 PROCopen(13,12,26,10,I%,3-I%)
120 PRINT'" BBC Windows."
130 PROCp(100)
140 PROCclose:PROCp(50)
150 NEXT
160 PROCopen(5,10,9,5,1,2)
170 PRINT" I'm"'"stillhere!"
180 PROCp(20)
190 PROCopen(1,10,25,1,3,1)
200 PRINT"BBC Windows."'
210 PRINT" - works in any mode"
220 PRINT" - uses sideways RAM"
230 PRINT" - overlapping windows"
240 PRINT'"  Like this ....."
250 PROCp(500)
260 PROCopen(10,15,30,4,0,3)
270 PRINT'"  And this ....."
280 PROCp(200)
290 PROCopen(15,16,25,5,2,1)
300 PRINT"Windows canbe opened"''"using
"''"'PROCopen'"
310 PRINT'"and closed with"''"'PROCclo
se'"
320 PROCp(500)
330 PROCclose
340 PROCp(50)
350 PROCclose
360 PROCopen(5,30,35,25,0,3)
370 PRINT"    PROCopen(x1,y2,x2,y1,f,b)
"
380 PRINT"    -------------------------
"
390 PRINT'"x1,y2,x2,y1 : As normal win
dows";
400 PRINT"f,b : foreground/background"
410 PRINT"               colours";
420 PROCp(500)
430 PROCclose
440 PROCopen(9,20,31,15,2,1)
450 PRINT"What do you think then?"
460 PRINT"Could you use something";
470 PRINT"like this in your"
480 PRINT"programs?"
490 PROCp(500)
500 PROCclose
510 PROCclose
520 PROCp(200)
530 PROCclose
540 MODE1
550 END
560 :
570 DEF PROCp(paws)
580 TIME=0:REPEATUNTILTIME>paws
590 ENDPROC
600 :
610 DEF PROCinit
620 start=&8000:end=&C000
630 open=&990:close=&900
640 slot=4
```

Continued ▶

◀ Windows listing 3 continued

```
650 *LOAD WINDOW
660 ?&7B=slot
670 ?&84=start MOD 256
680 ?&85=start DIV 256
690 ENDPROC
700 :
710 DEF PROCopen(L,B,R,T,f,b)
720 IF(?&84+256*?&85)+?&34F*((R-L+1)*(
B-T+1))>end PRINT"Not enough RAM":END
730 ?&70=L:?&71=B:?&72=R:?&73=T
740 ?&88=f:?&89=b
750 CALLopen
760 ENDPROC
770 :
780 DEF PROCclose
790 IF?&84+256*?&85=start PRINT"No Win
dows open":END
800 CALLclose
810 ENDPROC
```

Listing 3a. Changes for listing 3 to work in mode 4

```
 60 MODE4:HIMEM=&3000:VDU23;8202;0;0;0;
 80 FORI%=1TO200:GCOL0,RND(2)-1
110 PROCopen(13,12,26,10,I%MOD2,1-I%MOD
2)
160 PROCopen(5,10,9,5,0,1)
190 PROCopen(1,10,25,1,1,0)
260 PROCopen(10,15,30,4,0,1)
290 PROCopen(15,16,25,5,1,0)
360 PROCopen(5,30,35,25,0,1)
440 PROCopen(9,20,31,15,1,0)
620 start=&3000:end=&5800
```

See Menu Maker, page 99

Listing 1. Personalising the Compact Desktop software

```
 10 REM Personalised Desktop
 20 REM by Acorn Computers Ltd
 30 REM modified by David Atherton
 40 REM for Master Compact
 50 REM (c) Acorn User December 1986
 60 :
 70 PROCptrinit
 80 *SHADOW
 90 *FX15,1
100 MODE 128
110 VDU 23,16|
120 *SETPAL
130 keyw%=54:keyh%=15*4
140 *FX4,3
150 DIM str% 256
160 PROCcursor(0)
170 ON ERROR GOTO 990
180 screenR%=1280:screenT%=1024-32
190 stepX%=16:stepY%=16:stepmult%=4
200 chY%=32:chX%=16
210 MX%=0:MY%=0:MW%=0:MH%=0
220 Mflag%=0
230 warnX%=320:warnY%=400
240 warnW%=320:warnH%=192+chY%
250 *CLOSE
260 C%=OPENUP "Dirfile"
270 IF C%=0 THEN PROCerr("Can't find Di
rfile")
280 B1$=FNgetstr(C%):B2$=FNgetstr(C%)
290 B3$=FNgetstr(C%)
300 ttlL%=LEN B1$
310 IF LEN B2$>ttlL% THEN ttlL%=LEN B2$
320 IF LEN B3$>ttlL% THEN ttlL%=LEN B3$
330 ttlX%=624-ttlL%*8:ttlY%=208
340 ttlW%=chX%*(2+ttlL%):ttlH%=224
350 Ms%=VAL FNgetstr(C%)-1
360 IF Ms%<0 THEN PROCerr("Dirfile - Ba
d number")
370 t$=FNgetstr(C%)
380 IF t$<>"" THEN PROCerr("Dirfile - 4
th line not null")
```

Continued ▶

◀ **Desktop listing 1 continued**

```
 390 DIM MN$(Ms%,12),file$(Ms%,12)
 400 DIM Mpos%(Ms%), Mdep%(Ms%)
 410 a%=-1
 420 REPEAT
 430 d%=-1:mw%=0:a%=a%+1
 440 REPEAT
 450 d%=d%+1
 460 t$=FNgetstr(C%)
 470 PROCassign(a%,d%)
 480 tmw%=LEN MN$(a%,d%)
 490 IF tmw%>mw% THEN mw%=tmw%
 500 UNTILt$=""
 510 MN$(a%,d%)=CHR$(0)
 520 FOR i=1 TO d%-1
 530 MN$(a%,i)=LEFT$(MN$(a%,i)+STRING$(m
w%,CHR$ 32),mw%)
 540 NEXT
 550 Mdep%(a%)=d%-1
 560 IF a%=0 THEN Mpos%(a%)=32:GOTO 580
 570 Mpos%(a%)=Mpos%(a%-1)+LEN MN$(a%-1,
0)*chX%+64
 580 UNTIL E% OR a%=Ms%
 590 CLOSE# C%
 600 :
 610 REM number of windows-1
 620 windows%=4
 630 DIM windowX%(windows%),windowY%(win
dows%),windowW%(windows%)
 640 DIM windowH%(windows%),windowMxW%(w
indows%),windowMnW%(windows%)
 650 DIM windowMxH%(windows%),windowMnH%
(windows%),active%(windows%)
 660 DIM stack%(windows%),flag%(windows%
)
 670 stkptr%=-1
 680 FOR i%=0 TO windows%
 690 active%(i%)=FALSE:NEXT
 700 REM Top of screen heading
 710 GCOL0,1:PROCbox(0,950,1279,1023)
 720 GCOL32,0:PROCbox(4,954,1275,1019)
 730 FOR i%=0 TO Ms%
 740 PROCtextwindow(MN$(i%,0),Mpos%(i%),
960)
 750 NEXT i%
 760 PROCtitlepage
 770 cursorW%=2*chX%
 780 cursorH%=2*chY%
 790 CX%=ADVAL(7):CY%=ADVAL(8)
 800 REPEAT
 810 *FX22
 820 *POINTER
 830 REPEAT
 840 p%=INKEY(0)
 850 UNTIL p%>-1
 860 REM new arrow position
 870 PROCcursorposn
 880 *POINTER 0
 890 *FX23
 900 thisM%=Ms%+1
 910 REPEAT
 920 thisM%=thisM%-1
 930 found%=CY%>950 AND CX%>=Mpos%(thisM
%) AND CX%<=Mpos%(thisM%)+48+16*LEN(MN$(t
hisM%,0))
 940 UNTIL found% OR thisM%=0
 950 IF found% PROCMrout(thisM%,0)
 960 REM arrow should be off screen
 970 UNTIL FALSE
 980 :
 990 *FX4,3
1000 *POINTER 2
1010 I%=-1
1020 REPEAT I%=I%+1
1030 str%?I%=I%?(1+!&FD)
1040 UNTILstr%?I%=0
1050 str%?I%=13
1060 IF FNerror($str%) GOTO 700
1070 VDU 4,30,10,10,13
1080 *FX23
1090 *POINTER 0
1100 *DIGITAL 0
1110 *KEYS 0
1120 *FX4
1130 *FX229
```

Continued ▶

◀ **Desktop listing 1 continued**

```
1140 END
1150 :
1160 DEF FNerror(A$)
1170 ON ERROR OFF
1180 warnW%=(2+LENA$)*chX%
1190 IF warnW%<10*chX%warnW%=10*chX%
1200 IF Mflag% PROCkillM
1210 MOVE warnX%,warnY%
1220 PLOT 0,warnW%,warnH%
1230 VDU 23,27,1,4,0;0;0;
1240 GCOL 0,1
1250 PROCboxr(warnX%,warnY%,warnW%,warnH
%)
1260 GCOL 0,0
1270 PROCboxr(warnX%+4,warnY%+4,warnW%-8
,warnH%-8)
1280 *SCHOOSE 8
1290 PLOT &ED,warnX%+chX%,warnY%+chY%DIV
2-8
1300 VDU 5:GCOL0,1
1310 MOVE warnX%+chX%,warnY%+warnH%-1*ch
Y%
1320 PRINT"Error";
1330 MOVE warnX%+chX%,warnY%+warnH%-2*ch
Y%
1340 PRINTA$;
1350 PROCcursor(0)
1360 REPEAT UNTIL GET=13 OR((ADVAL(0)AND
7)<>0)
1370 *SCHOOSE 4
1380 PLOT &ED,warnX%,warnY%
1390 GCOL 0,1
1400 ON ERROR GOTO 990
1410 =(ERR<>17)
1420 :
1430 DEF PROCMrout(thisM%,key%)
1440 IF key%=0 PROCpulldown:ENDPROC
1450 a$=file$(thisM%,key%)
1460 OSCLI"DIR "+file$(thisM%,0)
1470 IF LEFT$(a$,2)="**" THEN OSCLI "*/"
+MID$(a$,3):ENDPROC
1480 IF ASC a$=42 THEN OSCLI a$:ENDPROC
1490 CHAIN a$:END
1500 :
1510 REM Pull down Menu routines
1520 DEF PROCpulldown
1530 LOCAL stepY%,stepmult%,MX%,MY%,MW%,
MH%,MD%,o%,key%,i%
1540 stepY%=keyh%:stepmult%=1
1550 MX%=Mpos%(thisM%):MY%=948
1560 MD%=Mdep%(thisM%)
1570 MW%=48+16*LEN(MN$(thisM%,1))
1580 MH%=-MD%*keyh%-8
1590 key%=FNMkey
1600 PROCliveM
1610 REPEAT
1620 REPEAT
1630 *FX22
1640 *POINTER
1650 REPEAT
1660 p%=INKEY(0)
1670 PROCcursorposn
1680 key%=FNMkey
1690 UNTILkey%<>o%ORp%>-1
1700 *POINTER 0
1710 *FX23
1720 IF o%>0 AND o%<=MD% PROCinvert(MN$(
thisM%,o%),MX%+8,MY%-o%*keyh%)
1730 o%=key%
1740 IF key%>0 AND key%<=MD% PROCinvert(
MN$(thisM%,key%),MX%+8,MY%-key%*keyh%)
1750 UNTIL p%>-1 OR key%>MD%
1760 IF key%>0 AND key%<=MD% ELSE GOTO17
90
1770 PROCMrout(thisM%,key%)
1780 IF Mflag% ELSE PROCliveM:PROCinvert
(MN$(thisM%,key%),MX%+8,MY%-key%*keyh%)
1790 UNTIL key%>MD%
1800 PROCkillM
1810 REM put cursor back on grid
1820 CX%=stepX%*(CX% DIV stepX%)
1830 CY%=stepY%*(CY% DIV stepY%)
1840 ENDPROC
1850 :
1860 DEF PROCkillM
```

Continued ▶

◀ Desktop listing 1 continued

```
1870 REM put back area under M
1880 *SCHOOSE 4
1890 GCOL 0,0
1900 PLOT &ED,MX%,MY%+MH%
1910 Mflag%=FALSE
1920 ENDPROC
1930 :
1940 DEF PROCliveM
1950 REM save area under M
1960 MOVE MX%,MY%:PLOT 0,MW%,MH%
1970 VDU 23,27,1,4,0;0;0;
1980 GCOL 0,1
1990 PROCboxr(MX%,MY%,MW%,MH%)
2000 GCOL 0,0
2010 PROCboxr(MX%+4,MY%-4,MW%-8,MH%+8)
2020 FOR i%=1 TO MD%
2030 PROCtextwindow(MN$(thisM%,i%),MX%+8
,MY%-i%*keyh%)
2040 NEXT
2050 Mflag%=TRUE
2060 ENDPROC
2070 :
2080 DEF FNMkey
2090 IF MX%>CX% OR CX%>MX%+MW%:=MD%+1
2100 =INT((MY%-CY%-12)/keyh%+1)
2110 :
2120 DEF PROCcursor(X%)
2130 VDU 4,23,1,X%,0,0;0;0;
2140 ENDPROC
2150 :
2160 DEF PROCtextwindow(text$,x%,y%)
2170 GCOL 0,1
2180 MOVE x%,y%
2190 PLOT &61,32+chX%*LENtext$,chY%+16
2200 GCOL 0,0
2210 PLOT 0,-3,-1:PLOT &65,x%+4,y%+4
2220 GCOL 0,1:VDU 5
2230 MOVEx%+16,y%+36
2240 PRINTtext$:PROCcursor(0)
2250 ENDPROC
2260 :
2270 DEF PROCinvert(text$,x%,y%)
2280 MOVE x%+4,y%+4
2290 PLOT &62,24+16*LENtext$,32+8
2300 ENDPROC
2310 :
2320 DEF PROCbox(leftx%,bottomy%,rightx%
,topy%)
2330 MOVE leftx%,bottomy%
2340 PLOT &65,rightx%,topy%
2350 ENDPROC
2360 :
2370 DEF PROCboxr(leftx%,bottomy%,w%,h%)
2380 MOVE leftx%,bottomy%
2390 PLOT &61,w%,h%
2400 ENDPROC
2410 :
2420 DEF PROCcursorposn
2430 CX%=ADVAL(7):CY%=ADVAL(8)
2440 ENDPROC
2450 :
2460 DEF PROCtitlepage
2470 GCOL 0,1
2480 PROCboxr(ttlX%,ttlY%,ttlW%,ttlH%)
2490 GCOL 0,0
2500 PROCboxr(ttlX%+4,ttlY%+4,ttlW%-8,tt
lH%-8)
2510 VDU 5:GCOL 0,1
2520 MOVE ttlX%+chX%,ttlY%+ttlH%-chY%*1
2530 PRINT B1$;
2540 MOVE ttlX%+chX%,ttlY%+ttlH%-chY%*3
2550 PRINTB2$;
2560 MOVE ttlX%+chX%,ttlY%+ttlH%-chY%*5
2570 PRINT B3$;
2580 ENDPROC
2590 :
2600 DEF FNgetstr(chan)
2610 LOCAL I$,I%
2620 REPEAT
2630 E%=EOF#chan:IF E% GOTO 2680
2640 I%=BGET#chan
2650 IF I%>31 THEN I$=I$+CHR$I%
2660 UNTIL I%=13
2670 IF ASC I$=32 THEN I$=MID$(I$,2)
```

Continued ▶

◀ Desktop listing 1 continued

```
2680 =I$
2690 :
2700 DEF PROCassign(x,y)
2710 LOCALcomma
2720 comma=INSTR(t$,",")
2730 IF comma GOTO 2750
2740 IF t$="" THEN ENDPROC ELSE PROCer
"No comma in "+t$)
2750 MN$(x,y)=FNstrip(LEFT$(t$,comma-1
2760 file$(x,y)=FNstrip(MID$(t$,comma+
)
2770 IF d%=0 THEN MN$(x,y)=FNstrip(MII
MN$(x,y),5))
2780 ENDPROC
2790 :
2800 DEF FNstrip(A$)
2810 IF ASC A$=32 THEN A$=MID$(A$,2):(
0 2810
2820 IF RIGHT$(A$,1)=" " THEN A$=LEFT$
$,LEN A$-1):GOTO2820
2830 =A$
2840 :
2850 DEF PROCptrinit
2860 *SPRITE
2870 *POINTER 0
2880 *KEYS 0
2890 *DIGITAL 0
2900 *MOUSE 0
2910 *TRACKERBALL 0
2920 *POINTER 0
2930 *KEYS
2940 ENDPROC
2950 :
2960 DEF PROCerr(A$)
2970 I%=FNerror(A$)
2980 END
```

Listings 2 to 12. Sample programs

```
   10 REM Listing 2
   20 REM by David Ather
ton
   30 REM (c) Acorn User
 1986
   40 :
   50 PRINTTAB(0,28);
   60 *FREE
   70 *FX15
   80 A=GET
   90 *DIR ^
  100 CHAIN"MENU"
```

```
   10 REM Listing 3 - So
und 1
   20 MODE 7
   30 PRINT"This is Soun
d 1"
   40 SOUND 1,-15,100,10
   50 END
```

```
   10 REM Listing 4 - So
und 2
   20 MODE 7
   30 PRINT"This is Soun
d 2"
   40 SOUND 1,-15,50,10
   50 END
```

```
   10 REM Listing 5 - So
und 3
   20 MODE 7
   30 PRINT"This is Soun
d 3"
   40 SOUND 1,-15,25,10
   50 END
```

```
   10 REM Listing 6 - Sq
uare
   20 MODE 1
   30 MOVE 100,100
   40 DRAW 1000,100
   50 DRAW 1000,1000
   60 DRAW 100,1000
   70 DRAW 100,100
   80 END
```

```
   10 REM Listing 7 - Tr
iangle
   20 MODE 1
   30 MOVE 100,100
   40 DRAW 1000,100
   50 DRAW 500,1000
   60 DRAW 100,100
   70 END
```

```
   10 REM Listing 8 - Fi
lled Square
   20 MODE 1
   30 GCOL 0,2
   40 MOVE 100,100
   50 DRAW 1000,100
   60 PLOT 85,1000,1000
   70 MOVE 100,1000
   80 PLOT 85,100,100
   90 END
```

```
   10 REM Listing 9 - Fi
lled Triangle
   20 MODE 1
   25 GCOL 0,1
   30 MOVE 100,100
   40 DRAW 1000,100
   50 PLOT 85,500,1000
   60 DRAW 100,100
   70 END
```

```
   10 REM Listing 10 - Q
UIT
   20 MODE 7
   30 END
```

```
   10 REM Listing 11 - L
ogLOGO
   20 *SRLOAD LOGO 8000
6 I
   30 *LOGO
```

```
   10 REM Listing 12 - V
iew
   20 *SRLOAD WORD 8000
7 I
   30 VDU 20
   40 *WORD
```

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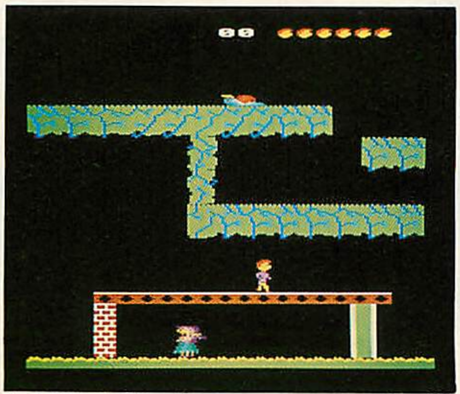
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TOP 20 BBC MICRO GAMES

		Title	Publisher	Cassette	Disc	B+	Master	Reviewed
1	(3)	Kane	Mastertronic	£1.99	—	No	No	—
2	(2)	Psycastria	Audiogenic	£7.95	£11.95	Yes	Yes	—
3	(1)	Thrust	Superior	£7.95	£11.95	Yes	Yes	—
4	(11)	Spy Hunter	US Gold	£9.99	£14.99	No	*	October '86
5	(4)	League Challenge	Atlantis	£2.99	—	No	No	—
6	(–)	Trivial Pursuit	Domark	£14.95	£19.95	Yes	Yes	—
7	(5)	Commando	Elite	£9.95	£14.95	Yes	Yes	August '86
8	(7)	Air Wolf	Elite	£9.95	£14.95	Yes	Yes	—
9	(10)	Ian Bothams Test Cricket	Tynesoft	£7.95	£11.95	Yes	Yes	—
10	(–)	Galaforce	Superior	£9.95	£11.95	Yes	Yes	December '86
11	(8)	Mikie	Imagine	£8.95	—	No	No	November '86
12	(9)	Commonwealth Games	Tynesoft	£7.95	£9.95	Yes	Yes	—
13	(7)	Cricket	Bug Byte	£2.99	—	Yes	Yes	December '86
14	(14)	Winter Olympics	Tynesoft	£9.95	—	*	*	September '86
15	(15)	Bruce Lee	US Gold	£9.95	£14.95	No	No	August '86
16	(–)	Jack Attack	Bug Byte	£2.99	—	Yes	Yes	September '86
17	(–)	Raid Over Moscow	US Gold	£9.99	—	No*	No*	November '86
18	(18)	Citadel	Superior	£9.95	£11.95	Yes	*	March '86
19	(–)	Strike Force Harrier	Mirrorsoft	£9.95	£12.95	Yes	Yes*	January '86
20	(12)	Yie Ar Kung Fu	Image	£9.95	£12.95	Yes*	Yes*	March '86



Trivial Pursuit: Impossible questions, new at 6


Jack Attack: Attacking once more at number 16


Commando: Down one chart and up the other

TOP 10 ELECTRON GAMES

		Title	Publisher	Cassette	Disc	Reviewed
1	(1)	Commonwealth Games	Tynesoft	£7.95	£9.95	—
2	(2)	Galactic Patrol	Mastertronic	£1.99	—	—
3	(4)	Commando	Elite	£9.95	£14.95	August '86
4	(7)	Yie Ar Kung Fu	Imagine	£9.95	£12.95	March '86
5	(–)	Galaforce	Superior	£9.95	£11.95	December '86
6	(5)	Psycastria	Audiogenic	£7.95	£11.95	—
7	(6)	Mikie	Imagine	£8.95	—	November '86
8	(9)	Jack Attack	Bug Byte	£2.99	—	September '86
9	(–)	Computer Hits 10	Beau Jolly	£9.95	—	July '86
10	(–)	Killer Gorilla	Micro Power	£6.95	£9.95	—

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Commander Stryker under fire in the city


Battling in the air


An action close-up


Enemy equipment (Enhanced BBC Master version)


A camouflaged Battle fortress (Enhanced BBC Master version)

STRYKER'S RUN for the BBC Micro B, B+, Master and Master Compact.

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Stryker's Run features probably the best graphics ever seen on the BBC Micro; the action is intense and the animation is superlative.

The battlefield graphics include cities, edifices, wrecked buildings, trees gravestones, bridges, despatch-posts, military bases, helicopters and jet ships, with hills and mountains in the background. The Master-enhanced version also includes statues, watch-towers, a neglected cafe, a deserted cinema, aircraft hangars, aeroplanes, trucks and tanks.

For many years, a war has ensued between the Allied Nations and the Volgans. The battle was reaching a stalemate position, but recently the Allies through good intelligence work and some luck have managed to obtain the plans of the Volgan's next offensive. If the Allied Forces can capitalise on these plans they can end the impasse and the war. You play the role of Commander John Stryker commissioned to take this top-secret information to the Allies' HQ.

Your character in the game can jump, run, duck, fire his laser pistol and throw grenades. He can also board aircraft and fly them, making use of their more powerful weaponry.

Your opponents, the Volgans, have a variety of weapons at their disposal comprising rifles, pistols, grenades, machine-guns, mortars, mines, helicopter gunships, rocket launchers and SAM missiles.

Game Author: Chris Roberts.



PRICE: £9.95 (cassette), £11.95 (BBC Micro 5¼" disc), £14.95 (Master Compact 3½" disc).

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REVIEWS

GAMES

CHEAP AT THE PRICE



'Price of Magik', Level 9, BBC B and Master (text only), £9.95 (cassette).

Pity *Acorn User* isn't audio-visual. There would be a deal of whistlin' an' swaggerin' going on right now. *Price Of Magik* must be the nicest adventure Level 9 have ever produced – because I managed to finish it, and within two days! But come to think of it, it seemed just as devious as usual, so I probably just got lucky. Magnanimity in victory (but not in defeat).

The point of the game is to become as insane as possible and thereby defeat the evil Myglar to become the new guardian of the Red Moon Crystal. At least you know what you're supposed to be doing for once. (Level 9 please note, it does help if you're not left staggering around wondering what to do next – though I suppose you know that.) Anyone who attempts this game minus cheat-sheet is insane already and in with a good chance.

It's as dastardly as ever, with over 200 rooms, filled with nasty things causing sudden death. No, this isn't one of those boring games where you merely get killed every three moves. Here you decide that this world is not for you with the dawning realisation that you're educationally subnormal, rather than from frustration. You do get a chance to run away from things, and to rejuvenate yourself. My kind of game, in other words (Grecian 2000 rules!).

Now for a few tips: it's not wise to go around arbitrarily killing things – only kill if attacked. You can carry as much as you like – you don't have to go around dropping stuff all over the place. There are clues all around, you just have to be clever enough to recognise them. I was, of course. . . but, I did tell you I finished the game, didn't I?

However, I must admit to a few difficulties. This is no piece of cake. It took me at least four hours to make the lousy Bat bring me the wheel. But the desire to prove myself to the sniggering onlookers drove me ever onward. When the going gets tough, the tough get going.

The psychopaths at Level 9 have once again proved themselves to be vastly superior to any other adventure writers in the market, with all the wit and low cunning that we've come to expect from them. Still, I can now bask in the golden glow of victory – until the next one arrives.

Harry Sinclair

COLLABORATIVE COMPETENCE



'Galaforce', Superior Software/ Acornsoft, BBC B/B+/M/E cassette £9.95, 5.25in disc (model B and Master), 3.5in disc (Compact) £11.95

This is the first game to carry the prestigous dual Superior/Acornsoft logo, said to be the culmination of three months of negotiations and travels.

Both software houses have produced several excellent shoot-em-up games in the past, and *Galaforce* is another. It's played invader style, by controlling a ship equipped with auto-repeating cannon, which moves left and right at the bottom of the screen, while wave upon wave of ships attack in *Zalaga* style formations.

A neat touch is the ability to alter the colour combinations to suit your own TV or monitor – particularly valuable to those of us who do at least some of our computing on the old black and white portable – but, all in all, playing *Galaforce* is rather like listening to yet another ageing rock group – very smooth and professional but with none of the raw energy and originality which makes you sit up and take notice, enthusiasm renewed.

Unfortunately for folk like me with access to an Electron at home and a BBC micro at work, BBC micro and Electron versions are sold separately, instead of on a double sided tape. However, a labelling error meant I was sent a BBC micro version for review on my Electron. I subsequently exchanged this for the correct version, so I have played both.

The BBC micro game is more tuneful and of a satisfyingly infuriating level of difficulty, while on the Electron, the sound is poor, and the invaders' timing distressingly naive. If you can position yourself in the correct spot for each wave, they just line up to be zapped.

Though Superior now sell more copies of the Electron versions of their games, the packaging of *Galaforce* is, as usual, BBC micro orientated. The cassette version comes in a double cassette box – you feel you've been fooled into buying one cassette instead of two, and the box doesn't fit cassette storage racks.

Galaforce is, then, an unpretentious 'get them before they get you' game. However, if you want another one of this genre, you'll find the game better than most of the others around at the moment.

Bernard Emblem

SOFTWARE

MOVIE MADNESS

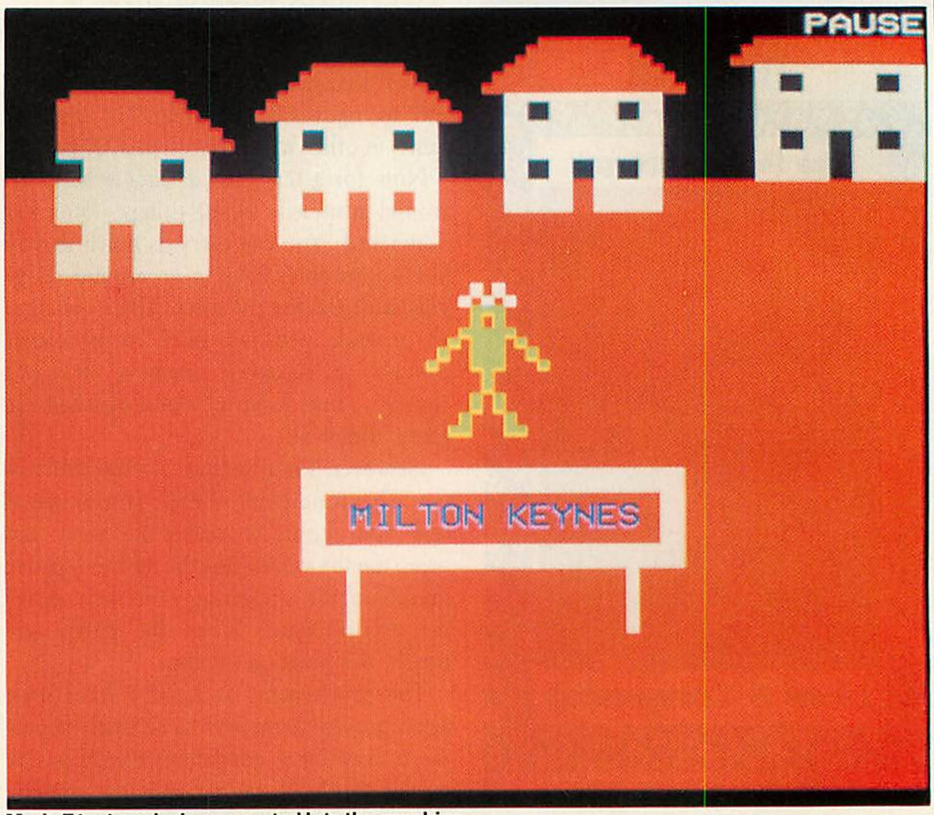
Phil Wilkes takes the director's chair to produce animated films on screen

Most people have at some time fancied having a go at making a film. Can a humble BBC micro help in fulfilling this ambition? *Movie Maker*, from the oddly named Slippery Slug, is an attempt to provide the means of producing animated 'films' using only the facilities of the micro. Don't think that you're going to become the next Speilberg, though! The animations are limited to the coarse teletext graphics of mode 7, and there are no facilities for including sound effects.

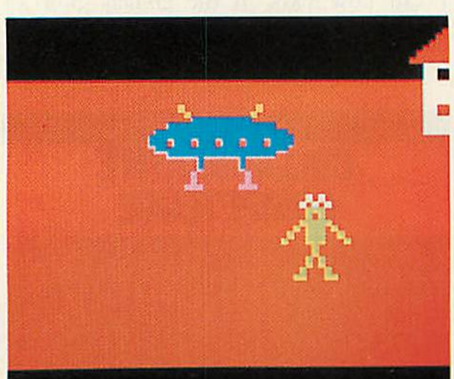
The package contains two ROM chips, a demonstration tape, an instruction booklet, a function key strip and a large scenery planning map. Once the ROMs are fitted, the program is entered simply by typing *MM. All of the code for entering, editing and running a film is contained on the ROMs – tapes or discs are needed only to load and save your masterpieces.

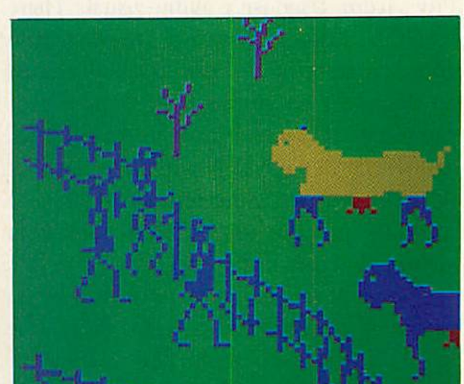
The system works quite happily with either tape or disc, although there is a warning that some minor difficulties may be found with non-standard disc interfaces. Recommendations for overcoming these are included in the manual.

On entering the program, a main menu is presented. This gives options to load or save a complete film, to load and run a film, to save the current frame or to list the memory contents. You are advised in the booklet tc run the demonstration film at this stage to get an idea of what the package is capable of.



Mode 7 text can be incorporated into the graphics


Walt Disney watch out . . .


. . . Phil Wilkes gets animated

Demonstration shorts

There are in fact two demonstration films. One does not need the ROMs present and is being sold with an introductory leaflet for £1.95. This is a great idea – it allows you to see what the package can do without having to spend a fortune on it first.

The second demonstration needs the ROMs to be fitted, and runs for a full 20 minutes. The story is dreadful, centring on an unhappy wheelbarrow and the attempts of a walking, talking shed to cheer it up! It does however show what can be done and, even more importantly, once you have seen it, you can examine it to find out exactly how it is done. I was particularly impressed by a sequence depicting a sunrise, in which the sky and ground changed colour as the sun rose majestically in the eastern sky.

But back to the package itself. It would be useful at this point to introduce a few basic concepts used throughout *Movie Maker*. All the action takes place on the Scenery Map, which spans many screens both up and down and side to side. The screen can scroll over this or jump to any location. On this map shapes can be placed, which are drawn on the Screen Pad. This is like a drawing pad, superimposed on the Scenery Map. When a shape has been drawn, it is 'defined', which gives the shape a name, a maximum size and places it on the Scenery Map. Shapes are limited to approximately one quarter of the full screen size, although larger shapes can easily be defined as two adjoining shapes.

Drawing uses a cursor which can be the size of either a single teletext pixel or a complete

character. Three pen positions are available – draw, rub out and up, and these are indicated on an informative message line at the bottom of the screen. The contents of the line change, depending on the pen position currently in use, and this makes sure that you always have a good idea of what you are doing.

All the features of mode 7 are available. The mode assumes the use of graphics, but text (single and double height, plus a special big text mode), foreground and background colours, flashing and separated graphics are all available. Indeed, the package can double as a standard teletext screen editor.

Once drawn, shapes may be repeated at other locations on the map. This is efficient on memory, as only the new co-ordinates are recorded – the shape itself is only held once. In this way, backgrounds are easy to build up from simple units. A street, for example, may be drawn by duplicating houses, or a forest by duplicating trees.

Making shapes move

Shapes may also be programmed and it is this facility that really makes *Movie Maker* unique. First, shapes can be made to move about the Scenery Map, simply by pointing to the shape, entering program mode and using the cursor keys to enter the movements. Diagonal movements are also possible using the shifted cursor keys.

Second, each shape can have a number of Edit Cycles defined, which allow animation of the shapes themselves.

The package conserves memory by defining a given movement, and then calling that movement when required. This allows the same movement to be repeated at any stage in the film. Both one-shot and repetitive movements are possible, the latter continuing until terminated by another command. Thus a person out walking or a bird flapping its wings is reasonably simple to achieve.

Text may also be programmed and may be used as a subtitle at the bottom of the screen, or as a scrolling bubble above the programmed shape. This is quite a clever means of allowing characters to talk, although it demands close attention by the viewer of the final film.

Once your film or presentation is complete, it is possible to use it on machines without the *Movie Maker* ROMs, using the stand-alone playback code contained on the demonstration tape.

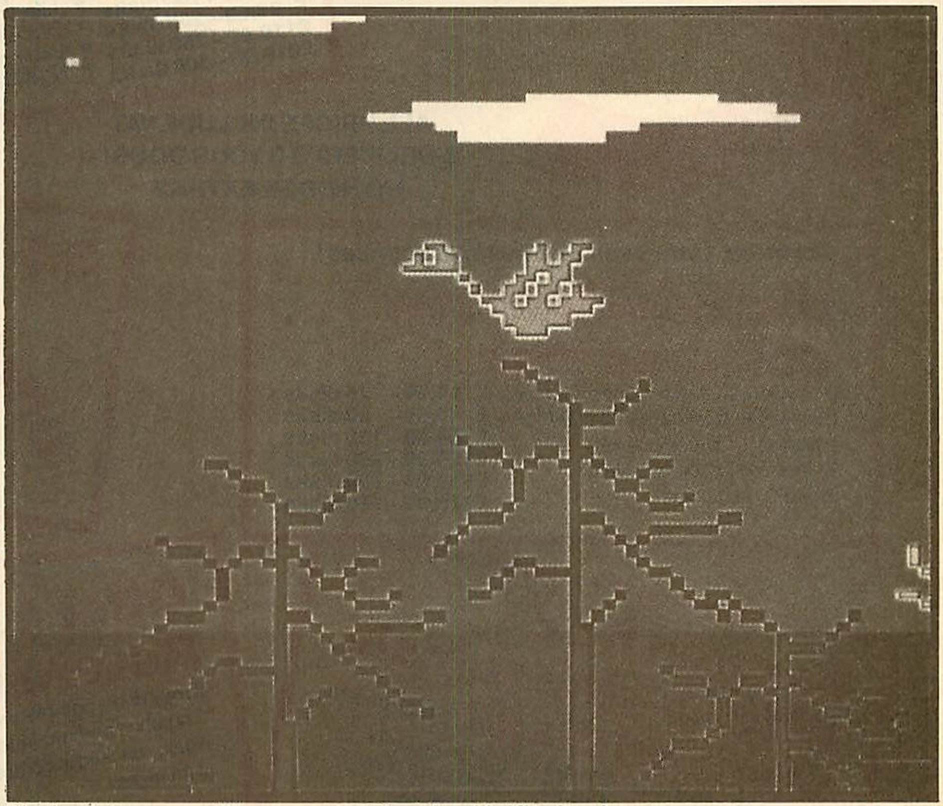
I will not go into exactly how each of these facilities is programmed as this would entail rewriting most of the manual. Suffice it to say that most of the facilities you would wish for are there, and it is always possible to edit or delete sections which have gone wrong (and I should know!). A range of information may also be called up to assist in knowing what is going on.

The package is however not the easiest I have ever had to get to grips with. Programming involves a combination of single key presses, cursor movements, function keys (alone and with Shift and Control) and star commands. The manual, while comprehensive, is not too well laid out (it is not clear where one section ends and another begins), contains few worked examples (although the one on animating a walking figure is very good) and there are a few typographical errors (my favourite being 'the data is created in a compact *manor*'!). Worst of all, there is no quick reference list or card. Given the multitude of different commands available, this is quite a serious omission, and one which would not have been hard to rectify.

That said, *Movie Maker* offers facilities for animated displays which only an experienced machine code programmer could otherwise achieve. The speed and maximum length of film possible are a credit to the programmers. However the package is handicapped by the inevitable choice of mode 7 to allow the memory needed for this. It would also greatly benefit from the inclusion of sound. If it were possible to integrate this package with a speech synthesizer, it would add yet another dimension to it.

Movie Maker is a difficult package to sum up. It is inevitably a complex and time-consuming task to define and choreograph a film animation, with this or any other method available, with or without computers.

Using *Movie Maker* makes the process accessible to anyone with a little application to learn the package and I have to say I enjoyed using it to produce a sample film for this review. It has applications not only for cartoon-type films but also for information displays of any kind where the animation and special effects possible could liven up an otherwise conventional teletext presentation.



It's simple to use repetitive movements to make a bird flap its wings

There is also nothing else available for the BBC micro which offers a comparable range of facilities. Therefore, while it has its limitations, I believe that *Movie Maker* is a valuable addition to the software available for the BBC range of micros.

I would, however, advise would-be buyers to see the demonstration tape before parting with the full price. This will show you exactly what can be done and should clarify whether or not it will meet your requirements. Should you go ahead, the cost of the demonstration tape will be deducted from the £29.90 charged for the full package.

The package includes two ROMs, demonstration tape, instruction booklet, function keystrip and a large scenery planning map. The entire package costs £29.90.

A demonstration package retailing at £1.95 can also be purchased; the cost is deducted from the full package price it purchased.

Movie Maker runs on the BBC B, B+, Master and Compact. Contact Slippery Slug, PO Box 83, Bath BA1 1ZA. Tel: (0225) 69236.

GAMES

PLAYER'S POSSE

A personal charting of David Lawrence's favourite games and adventures of 1986, plus one prize dud

Since the last *Acorn User* games roundup (February 1985), there has been a marked change in the way games have been produced. Previously, companies thought that quantity was the best policy and released large numbers of, let's face it, bad games. Nowadays, you'll be lucky to see a new release every month! However, the quality of games has improved dramatically, and most games currently on the market are well worth their price. In this article I present my personal top ten games of the last two years and also a special Golden Turkey Award.

Top Ten 1985/86	
1 *Thrust*	Superior Software
2 *Citadel*	Superior Software
3 *Boffin*	Addictive Software
4 *Revs*	Acornsoft
5 *Tapper*	US Gold
6 *Spy Hunter*	US Gold
7 *Trivial Pursuit*	Domark
8 *The Way of the Exploding Fist*	Melbourne House
9 *Repton 2*	Superior Software
10 *Galaforce*	Superior Software

Close contenders : *Airwolf* (Elite), *Scrabble* (Leisure Genuis) *Nightshade* (Ultimate), *Atic Atac* (Ultimate)

Top Five Adventures	
1 *Bored of the Rings*	Silversoft
2 *Worm in Paradise*	Level 9
3 *Emerald Isle*	Level 9
4 *Hampstead*	Melbourne House
5 *Terrormolinos*	Melbourne House

Thrust from Superior is one of the few games that has a simple, easy to follow plot, but still manages to become an extremely interesting and challenging game. 'Collect the pods and fuel; shoot the guns and reactors' – that's all there is to it. Except be warned, don't forget the laws of gravity, inertia and momentum! Good scrolling too.

Graphics	90 per cent
Sound	75 per cent
Addictiveness	90 per cent
Value	90 per cent

One of the few graphic adventures I have completed is *Citadel*, so I am slightly biased, but the game is very well written



Thrust: **simple rules but very challenging.**

with pretty graphics and fiendishly difficult puzzles spreading over at least 100 rooms. A sequel has also been promised.

Graphics	85 per cent
Sound	70 per cent
Addictiveness	80 per cent
Value	80 per cent

Addictive's *Boffin* might have been missed by some of you key-bashers out there. In my opinion, it is one of the best 'ladder and platform' games ever written. The idea is standard – collect all the objects on a screen (in this case horse-shoes) and make your way to the exit. The quality of the graphics is brilliant, especially the 'thing' in the fourth cave!

Graphics	89 per cent
Sound	75 per cent
Addictiveness	90 per cent
Value	86 per cent

Revs from Acornsoft is the best racing simulator on a home micro. Written by Geoffrey Crammond (author of *Aviator*) in conjunction with David Hunt. *Revs* is an extremely accurate representation of a formula three car, indeed on your first few goes maybe even too accurate (as you go spinning off the first bend for the umteenth time!), but once mastered *Revs* can be very addictive especially when trying to trim precious seconds off your lap time.

Graphics	95 per cent
Sound	85 per cent
Addictiveness	70 per cent
Value	60 per cent

Tapper was one of first BBC micro conversions from the highly popular Commodore 64 range of US Gold titles. Again the idea is simple – serve the customers in your bar with soda – but after the first couple of screens, the action becomes unbelievably hectic as the customers advance, slinging their glasses up the bar, and demanding more soda. Don't drop a glass or send too many down the bar as this doesn't go down well with the management!

Graphics	70 per cent
Sound	85 per cent
Addictiveness	85 per cent
Value	70 per cent

Spy Hunter, also from US Gold, places you in a sports car fitted with machine guns. You are placed on a road that goes through woods and over bridges and must shoot the enemy cars or ram them off the road. You can also be equipped with smoke screens, oil slicks and anti-aircraft missiles by 'docking' with the weapons van which occasionally appears. The car changes into a speedboat if you enter the boat house, and then the action continues on the water. All this drama is to the tune of good ol' 'Peter Gunn'.

Graphics	70 per cent
Sound	73 per cent
Addictiveness	80 per cent
Value	70 per cent

Domark's *Trivial Pursuit* is new, computer version of the cult board game. Three thousand questions are provided on tape or disc and the action is presided over by 'TP', a little cartoon character who asks the questions and keeps track of the score. The board display is a trifle cluttered, but on the whole it's a faithful copy of the original and just as taxing on the brain.

Graphics	75 per cent
Sound	75 per cent
Addictiveness	90 per cent
Value	60 per cent

GAMES

The first karate/kung fu type game on the BBC micro was *The Way of the Exploding Fist* from Melbourne House, and in my opinion it's the best. It survived conversion from the Commodore 64 well and provides either one or two player options. Please note, you have to be dextrous to play, as eight keys are used plus a 'kick' key, giving in total 18 different moves! (And the keys are reversed when you turn round!)

Graphics	87 per cent
Sound	80 per cent
Addictiveness	80 per cent
Value	80 per cent

Repton 2 is the second (surprise, surprise) in the *Repton* family. Its predecessor sold like hot cakes when it was released and rightly so, the graphics are excellent, the action fast and the whole game totally addictive. *Repton 2* followed on with a larger playing area, more puzzles and greater complexity, although it's slower.

Graphics	80 per cent
Sound	75 per cent
Addictiveness	70 per cent
Value	80 per cent

There haven't been too many shoot 'em up games recently, because they now need to be of a very high quality to sell at all, but *Galaforce* is one of the better ones and lives up to the usual Superior high standard. It contains very pretty, high-speed sprites, excellent sound effects and interesting attack formations.

Graphics	85 per cent
Sound	90 per cent
Addictiveness	75 per cent
Value	80 per cent

Of the adventures, *Bored of the Rings*, *Terrormolinos* and *Hampstead* have plenty of humour, and I highly recommend all Level 9 adventures for their depth, descriptions, puzzles and complexity.

And now for the bit you've been waiting for . . . the Golden Turkey award:

Which game had the biggest hype?

Which obtained rights from the BBC to use one of its characters?

Which made you take the top off your Beeb so you could play it?

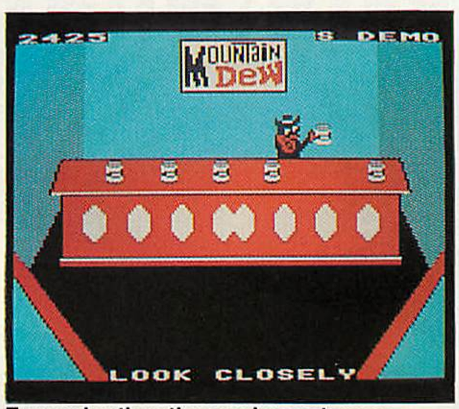
Which featured a programmable cat?

Which featured the word 'terror', which could easily have been replaced with the word 'boredom'?

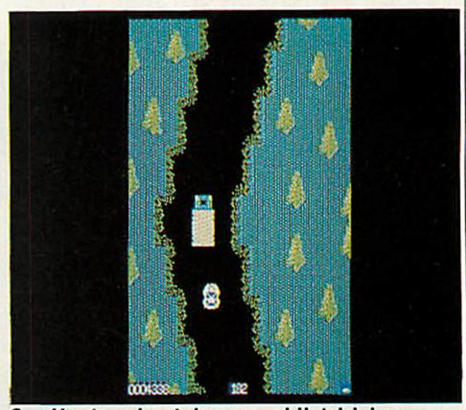
Answers on a post card to . . .



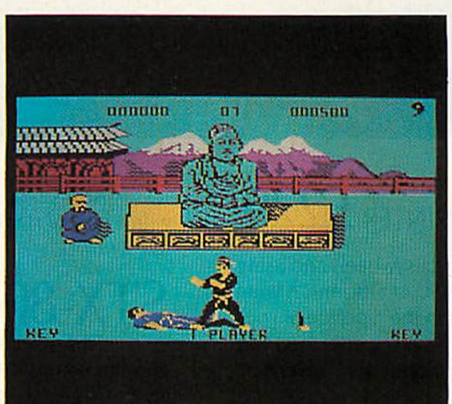
Boffin: **great graphics for a ladder and platform type of game**



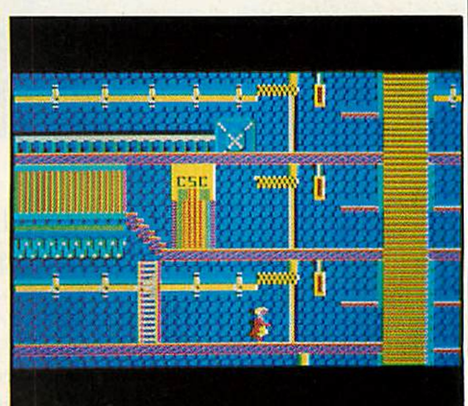
Tapper: **hectic action serving customers**



Spy Hunter: **shoot-'em-up whilst driving**



The Way of the Exploding Fist: **dexterity needed**



The Golden Turkey Award goes to this effort

GAMES

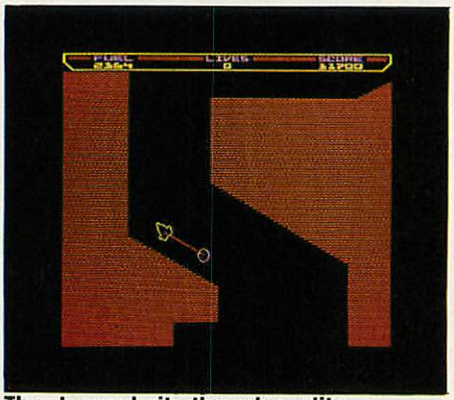
TOP TITLES

Electron round-up: Bernard Emblem picks the best from an expanding choice

1986 hasn't seen any major breakthroughs in game design, at least as far as the Electron is concerned, but we have seen some realistically priced re-releases, a few long awaited conversions, some excellent compilations, and one or two originals destined to become classics.

This year has seen the emergence of Superior Software as the leading source of new Electron games, a position recently enshrined in a partnership deal struck with former rivals Acornsoft, who found themselves victims of the Olivetti takeover. Acornsoft will be offering advice and their prestigious logo to Superior's new releases.

Other software houses to have made an impact during the year include several who have at last seen the potential of budget games for the Electron. Micropower have re-released classics at less than half their original price, while Bug Byte and Mastertronic have dominated the £1.99 and £2.99 markets respectively, with a mixture of the old and the new, good and bad – but always cheap. A policy of 'never mind the quality, look at the price' may seem a little dubious, but it works.



Thrust: popularity through quality

Interestingly, these budget games haven't made any noticeable impact in the BBC micro games market.

The games chosen for my Top 10 were all released during 1986, or are older games still selling well. Rather than just select the games I've enjoyed most, I've tried to produce a balanced selection of game types, and value for money as an important criteron. The younger players have been taken into account too.

Model B owners will be pleased to know that all the games chosen are also available for their machine, or will run unaltered – occasionally better than on the Electron, sometimes ridiculously fast!

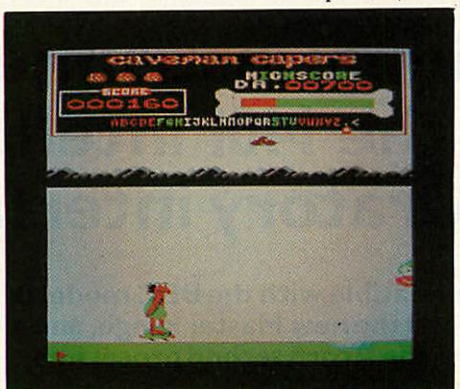
Top Ten 1985/6	
1 *Thrust*	Superior Software
2 *Cavemen Capers*	Aardvark
3 *Frak!*	ASL
4 *Bug Eyes 2*	ASL
5 *Repton 2*	Superior Software
6 *Twin Kingdom Valley*	Bug Byte
7 *Treasure Hunt*	Macsen
8 *Citadel*	Superior Software
9 *Computer Hits 10*	Beau Jolly
10 *Action Pack 2*	WH Smith/Alligata

My Game of the Year is *Thrust* (Superior Software, £7.95) a game with all the hallmarks of an arcade classic – wonderful keyboard response, the most convincing representation of gravity I've ever seen and – perhaps best of all – it's perfectly judged as a game. *Thrust* has 24 levels, each with the same theme – fly a rocket down to collect a pod from a planet. Level One is soon mastered, as the pod is protected by a single limpet gun, which experienced players can destroy with a single shot. On further levels things are naturally a good deal more difficult, with pods buried round corners, and deep beneath the planets' surfaces. It's a truly wonderful game.

Graphics:	90 per cent
Sound:	70 per cent
Addictiveness:	90 per cent
Value:	90 per cent

For family entertainment, two games have shared the honours in the Emblem household this year.

The first is *Cavemen Capers*, (£7.95 from Aardvark), a game I didn't take to at first, as the graphics, and the plot – jumping over and dodging under endless obstacles – are rather uninspired. But soon I realised that other people, particularly the younger members of the family, loved it. It has the virtue of being very simple to play – the initial obstacles can be negotiated using just the jump key – and though it soon requires careful positioning before jumping, it remained a firm favourite with the little 'uns.



Cavemen Capers: youngsters' favourite

Graphics:	50 per cent
Sound:	40 per cent
Addicitiveness:	70 per cent
Value:	70 per cent

I've selected *Frak*! for more family fun, (£7.95 from ASL). This version of one of 1985's best seller for the BBC micro is every bit as good as the original. It's a game with lots of novel features, designed to appeal to all styles of players. The game involves getting from one side of a series of obstacles to the other, on each of several screens, each screen involves several sideways scrolls. *Frak!* has a wonderfully smooth feel, with jumps and falls very true to life, and addictive sound effects. The most attractive feature for some players is the design your own screen feature. These DIY screens can then be saved on tape and used again. A very classy game.

GAMES

Graphics: 90 per cent
Sound: 90 per cent
Addictiveness: 80 per cent
Value: 80 per cent

Second versions of classics often sell well on the strength of the original – but soon prove disappointing. Two exceptions to this rule, *Bug Eyes 2* from ASL (£7.90) and *Repton 2* from Superior (£9.95), are games with that addictive quality that keeps you up at nights.

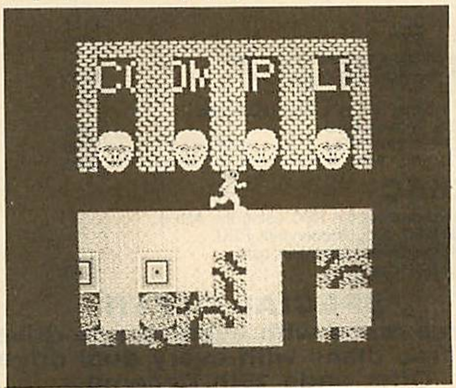
Bug Eyes 2 is a game with lots of humour and plenty of surprises, as you wander round the supposedly deserted shell of a huge spaceship, collecting keys and avoiding such hazards as flickering flames, snapping scissors, swishing swords and disappearing floors with plenty of nasty creatures, including an interloper or two from other games. It's the game played most in our house this year, and though I've never finished it, I have seen it done, which is always an encouragement.

Graphics: 80 per cent
Sound: 60 per cent
Addictiveness: 90 per cent
Value: 80 per cent

Repton 2 featured high in last year's charts, and it's remained a best seller throughout this year, becoming Superior's second best seller of 1986. I haven't had *Repton 2* long enough to get addicted, but I'm in no doubt that it has all the necessary qualities, and much of the humour of *Bug Eyes 2*. The plot is a similar and familiar one – collecting all sorts of things on each of a variety of interconnected screens. The Electron version features a smaller screen than the BBC micro version, but the game is almost as playable, my only complaint being that scrolling sometimes can be a little jumpy.

Graphics: 90 per cent
Sound: 50 per cent
Addictiveness: 80 per cent
Value: 70 per cent

For adventure fans, I've included three very different implementations of the adventure theme. First, and cheapest, is the best budget game I've played this year – Bug Byte's *Twin Kingdom Valley* (£2.99), a traditional adventure involving fighting your way through 175 illustrated locations while contending with 35 rather unfriendly creatures. Though I cannot recommend it unreservedly – mainly because of the inability to restart a game without reloading the whole thing – it's a very sophisticated program, offering a choice of screen display, including graphics which actually

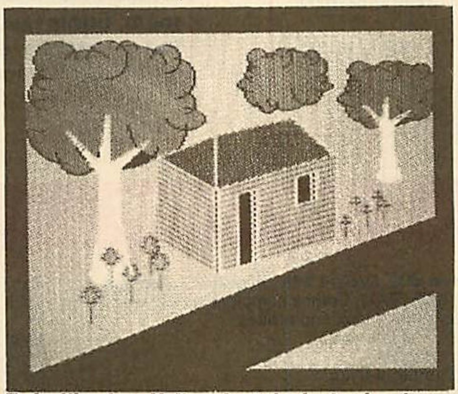


Repton 2: consistent seller for two years

help you play the game better. Very good value for money.

Graphics: 70 per cent
Sound: 70 per cent
Addictiveness: 70 per cent
Value: 90 per cent

Another thought provoking offering is *Treasure Hunt* (£9.95 from Macsen), one



Twin Kingdom Valley: best budget adventure

of a number of games based on popular TV series produced in collaboration with independent TV companies. This is an adventure game with a difference, involving searching for and solving cryptic clues in real loations shown on an on-screen map. It comes complete with a booklet of extracts from real guide books, and keen players can purchase supplementary data packs, to allow exploration of other UK locations. *Treasure Hunt* scores in originality, and its professional presentation.

Graphics: 60 per cent
Sound: N/A
Addictiveness: 70 per cent
Value: 70 per cent

Finally for adventurers, there's *Citadel*, another from Superior, at £9.95, and one of the most sophisticated games ever produced for the Electron. *Citadel* deserves inclusion because of the vastness of its map and the quality of its puzzles. It's a true arcade adventure, in which each of 100 screens involves arcade puzzles to be solved, often while under attack from a variety of nasties.

One of my pet hates is games which are too easy or too hard. We haven't been playing *Citadel* long enough to have got very far, but I'm impressed with the way the game starts fairly simply, with new players and youngsters able to make some progress before the really difficult problems present themselves.

Graphics: 90 per cent
Sound: 50 per cent
Addictiveness: 80 per cent
Value: 70 per cent

Finally, and particularly for new owners and those counting the pennies, let me recommend two compilations – *Computer Hits 10* from Beau Jolly at £9.95, and *Action Pack 2* from WH Smith/Alligata at only £4.99.

Computer Hits 10 features a mixed bag of oldies, not all of which could have been hits on the Electron, I'm sure, but it includes enough quality games to remain good value for money. Highlights are *Chukkie Egg, Guardian, Ghouls, Killer Gorilla,* and *Eddie Kidd's Jump Challenge.*

Graphics: N/A
Sound: N/A
Addictiveness: N/A
Value: 90 per cent

Action Pack 2 contains four high quality versions of standard arcade types – *Video's Revenge* (shoot everything that moves), *Q-Bix* (standard *Q-Bert*), *Tarzan Boy* (swing from tree to tree), and *Diamond Pete* (*Repton 2* for the fainthearted!).

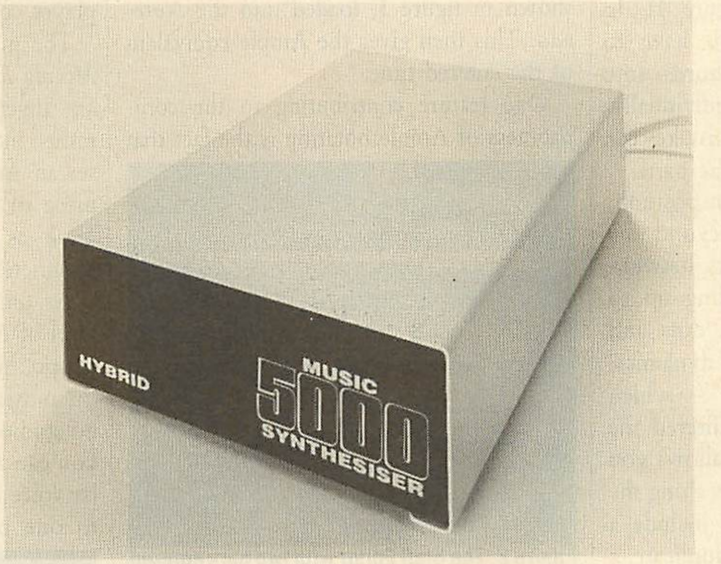
Graphics: N/A
Sound: N/A
Addictiveness: N/A
Value: 90 per cent

The outlook for 1987? With Electron versions of games now frequently selling better than BBC micro versions, I predict a reduction in prices, more conversions and compilations, more games available on disc, and the use of double sided Electron/BBC micro tapes as standard.

HARDWARE

MICRO MUSIC

David Johnson-Davies looks at Music 5000, a versatile composition and synthesis system



The first thing that most people would expect from a music system running on a computer is a graphical display of a musical staff, and an editor which allows you to enter music on the staff and play it. Hybrid's original Music 500 system, released two years ago and marketed by Acorn for the BBC micro, was undoubtedly a sophisticated piece of hardware but at the time it surprised and even shocked people that the only means of entering, editing, and playing music on the system was a programming language called Ample. The expected graphical display of music on conventional notation was missing.

The Music 5000 is Hybrid Technology's evolution of the Music 500; it uses substantially the same hardware, containing 16 independent note generators, and using multipliers to provide software control of the amplitude, envelope, and stereo position of each generator. It comes in a disc-drive sized unit which plugs into the BBC micro or Master's 1 MHz bus, and gives an output for a stereo amplifier. The main hardware difference from its predecessor is a modification to ensure it works correctly with a Master computer.

The software, however, has been considerably developed by Hybrid, and it is this that really makes it necessary to take an entirely fresh look at the 5000. The main additions are a real-time *Mixing Desk*, that allows you to alter the mix of a piece while it is playing, and a graphical *Staff Editor*, with facilities similar to other graphical music editing programs. The concept of a graphical editor is not new; most music programs provide this as the means of entering and editing music. The important difference is that the Music 5000 software retains Ample as the internal representation, and provides access to this representation if you want to work with the music in ways that are beyond the limits and capabilities of the Music 5000 *Mixing Desk* or *Staff Editor*.

There are two reasons why it is beneficial to have access to a more fundamental representation of the music. First, even if staff notation provides a good way of transcribing music, is not necessarily the best notation in which to compose or explore music. For one thing, its linear representation makes it hard to build structure into a composition. Second, it does not provide a good way of representing how music should be played; in fact modern composers usually supplement their musical works scores with lengthy written instructions and explanations.

What Hybrid have evolved over the past few years is a compact, efficient, programming language, Ample, which is ideally suited to representing aspects of music of interest to composers.

With the *Staff Editor* in the Music 5000 system, a graphical front-end has been provided which provides beginners with a bridge between music notation and the program language representation. After experimenting with the system, it is clear that this gives the best of both worlds; music can be entered and edited in staff notation if that is what you are familiar working with, but as soon as the limits of staff notation start to interfere with what you are trying to achieve, you can revert to the flexibility of programming in the language Ample.

The Music 5000 software consists of the *Ample Interpreter*, which has itself been considerably extended and now comes in a 16k ROM, and three front-end editors supplied on disc, themselves written in Ample. The *Staff Editor*, already described, allows music to be entered in conventional music notation and converted to Ample. The *Notepad* is a screen-editor, which provides a convenient way of editing Ample words, and has special facilities for editing instrument definitions using pop-down menus of the available envelopes and waveforms. The *Mixing Desk* allows pieces in several parts to be mixed, as in a studio. The package is supplied with impressive demonstration pieces which can be analysed for technique.

As an example of how all the components of the Music 5000 system are used together, consider the process of building the line of music shown in figure 1 into a complete composition.

First, the music is typed into the *Staff Editor*. The position after typing in two bars is shown in figure 2, the whole piece as represented across several *Staff Editor* screens is shown in figure 1.

The *Staff Editor* gives a graphical display of a musical stave, with treble and bass clef, onto which you can type music in roughly the same way as you would write it onto a page. For example, to enter a dotted crotchet at middle C you press Return to get a note, alter its duration with Shift → or ← until it becomes a crotchet, slide it up and down the stave lines with Shift ↑ and ↓ to the correct position, and then type Return again to enter it. Finally, just type '.' to make it a dotted note. If you want a note to be sharp or flat, you press the + or − key before entering the note, and a sharp or flat symbol appears in front of the note, as on the sheet music representation. One

feature of the editor which particularly impressed me was its handling of chords; you simply type in the component notes, one after the other, to give an exploded version of the chord, (see figure 1). In some other music editors you have to separate a tune containing chords into several parts and enter them individually; this is cumbersome, and small mistakes can make it very difficult to align the parts.

Other features include transposition, allowing you to enter notes beyond the range of the staves, ties or slurs between notes, triplets (three notes adding up to two normal ones) and duplets, dots and double dots, rests, changes of dynamics, time signatures and bar lines – which together check that you have entered the correct note lengths. The editor allows you to scroll backwards and forwards along the music, and the editing features include a block copy, allowing you to duplicate a sets of notes.

Once entered the tune can be played back immediately, complete with chords, unlike some other programs which only allow you to play one part at a time without transferring to a separate program. The only obvious limitation is that each bar is not displayed as it is being played, perhaps this is not surprising given the processing overheads it would cause.

As you enter and edit music in the *Staff Editor*, it is actually stored internally in Ample notation. The close relationship between the *Staff Editor* and Ample is highlighted by the facility allowing sections of Ample program to be written above the stave, between two sections of music, to alter the way that the music is played. For example, in the penultimate bar of the example of figure 1, the pre-defined word 'Len' is used to set a gap between notes to give them a staccato quality. The *Staff Editor* 'Make' command displays the Ample equivalent of the piece, and makes it into a defined word.

The word definition for 'part1' made from the *Staff Editor* tune of figure 1 is shown in figure 3, loaded into the *Notepad*. This then gives the Ample equivalent of the entered tune.

One feature contributing to the compactness of Ample notation is the fact that

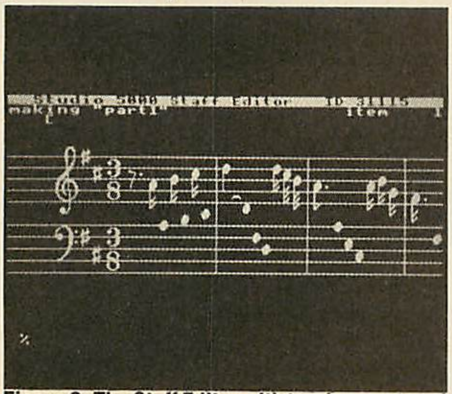


Figure 2. The Staff Editor with two bars entered

the characteristics of the music, such as the tempo, amplitude, playing style, instrument, or note length, are stored not as attributes of every note as in some systems, but as changes only when they occur within the music. This makes the notation easy to read, and it should be clear from the following how figure 3 corresponds to the first few bars in figure 1.

The symbol '|' separates bars, and the letters A to G correspond to the notes of the scale, capitals give ascending notes, lower-case descending notes. Brackets enclose subsequent notes of a chord, thus the first chord of the second bar is written 'A(aec)'. Rests denoted by ↑ give a unit of silence, whereas the '/' symbol leaves a note playing for a further unit of time. The values '6,' and '12,' set the lengths of subsequent notes, and an instruction such as '0:' sets the octave.

Finally, a complete tune is created by defining a word 'Run' which lists all the parts to be combined. For example, we could add a percussion part called 'part2' which would be played by a different player concurrently with the piano part.

The music can then be loaded into the *Mixing Desk*, as shown in figure 4. This is an ingenious and intriguing program, rather like a studio desk. Once you have set an Ample program running, playing a piece of music, you can run the *Mixing Desk* as a concurrent task to alter the parameters of the music, as it is playing.

As on a studio desk you can alter the level of each voice, its stereo position, the tempo, and you can fast-forward through the music. You can also do something that no studio can do; while the piece is playing you can alter the instrument that a particular voice is using, or that all voices assigned to one player are using; in the example

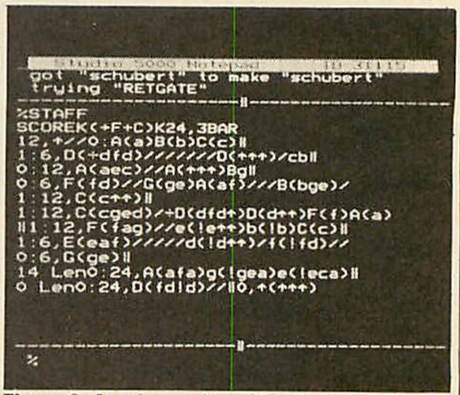


Figure 3. Ample version of the Notepad piece

they are all 'Upright', the piano sound. A library of pre-defined instruments is supplied with the system, and these can be edited, or new ones defined, using the *Notepad* section.

As with the *Staff Editor*, the *Mixing Desk* settings can be converted to a standard Ample word definition – in this case 'mix' – and embedded permanently in the definition of the piece of music you are

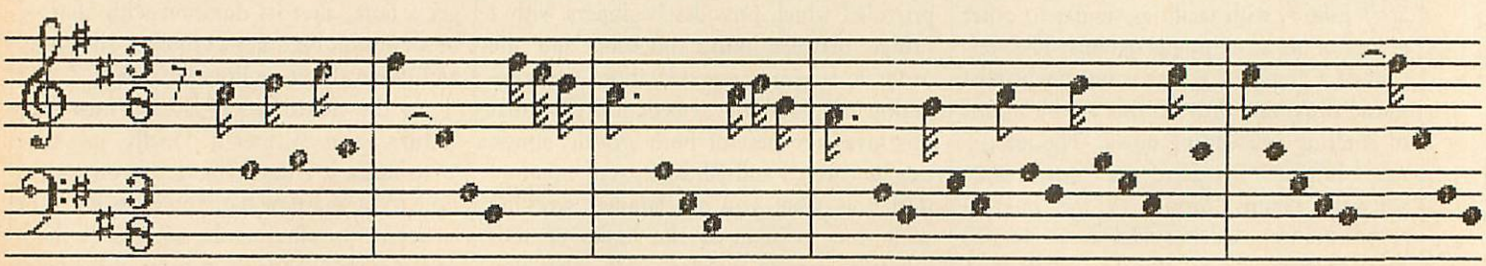


Figure 1. An edited sample of music using the Music 5000 system

creating. To examine and edit the mix definition it can alternatively be loaded into the *Notepad*, see figure 5.

Several sample pieces are supplied with the Music 5000 software, and so before you even come to terms with writing music you can have a fascinating time playing with the *Mixing Desk* using these.

Whereas the *Staff Editor* provides a convenient way of entering existing music, for composing music Ample's superiority soon becomes apparent. Music often contains structures and patterns that are obscured by staff notation. For example, the structure might be the repetition of the same sequence of notes in different parts. In conventional notation the repeated phrase would usually have to be written out each time. If a piece consists of essentially the same theme transposed, or inverted, as in a fugue, then it requires quite advanced decoding skills to extract the structure that was originally in the composer's mind, from the transcription of the music into a written score.

The structure can be preserved in an Ample program, which as a result is a comprehensive and compact representation of the piece of music, even if it is not what we are used to seeing.

The fact that underneath the niceties of the *Staff Editor* and *Mixing Desk* is a fully-fledged programming language means that you can call on the programming facilities in a piece of music, should you have to. As a simple example, you could specify that one part in a piece of music consisted of four chords, played randomly. Unfortunately only the words needed for musical composition are defined in the User Guide, but a Programmer's Guide will be available separately and will be essential for experiment.

Anyone who has tried writing multi-part music in BBC Basic will soon have realised that a full music system needs to be able to execute several programs concurrently. Ample's whole design is based on concurrency, and several new words included in the ROM version of Ample supplied with the Music 5000 streamline the playing of multi-part music. For example, the Play word allows you to play several parts simultaneously, with optional repetitions.

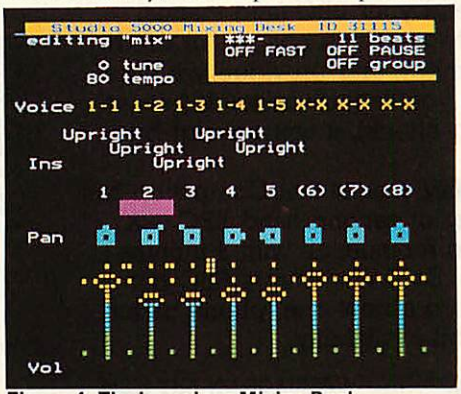


Figure 4. The ingenious Mixing Desk

Suppose you have defined the three separate parts of a piece of music, which might correspond to piano, flute, and percussion, as 'part1', 'part2', and 'part3' respectively; then typing:

"123" PLAY

gets all three programs running simultaneously. Ample calls the tasks that run each program 'players', by analogy with the members of a band or orchestra. In this example the player of the piano part would be assigned four voices so that chords of up to four notes could be played. The other players would need one voice each. The words defining each part, 'part1', 'part2', and 'part3', could have been written separately using the *Staff Editor*.

Another area that is substantially improved over the earlier version of Ample used on the Music 500 is the design of instruments, and the assignment of channels to them. Now instruments can be mixed quite freely, each claiming channels automatically as it needs them.

The problems of programming directly in Ample made me hesitate before recommending Hybrid's previous product, the Music 500, to anyone without a fair amount of previous programming experience. The additional software provided in the new Music 5000 package has overcome this criticism, without reducing the power and flexibility of the system, and I would recommend it to anyone who is interested in composing music, or experimenting with the construction of existing music, either with or without prior musical training. The whole system costs £161 including VAT through Peartree and existing owners of the Music 500 are catered for by an upgrade pack, available from Hybrid for £69 including VAT.

Perhaps the most exciting possibilities

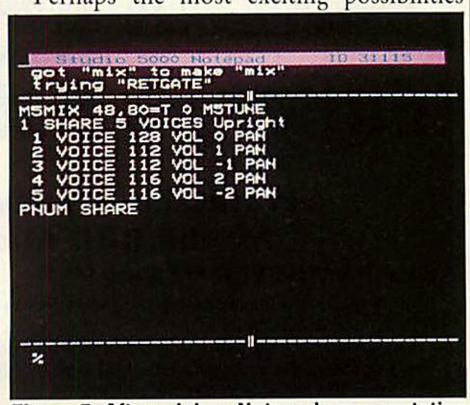


Figure 5. After mixing, Notepad representation

for the use of the system are in education. The Ample language certainly places fewer constraints on creativity than conventional musical notation, and I hope that children are given the opportunity to use Ample as part of the process of learning about music.

'Music 5000', Peartree Computers Ltd, St George's House, 14 George Street, Huntingdon, Cambs, PE18 6BD, Tel: (0480) 50595, BBC B, B+, Master 128, £161.



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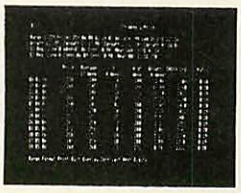
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Our Red Boxes operate a secure communications protocol. Incorporating tamper-proof PIN codes. All 'slaves' – outlets, sensors, switches – are first introduced to Red Leader using their own secret 24 bit address. Secret 'keys' are assigned to every device – lights, TV etc., known ONLY to you, and messages between devices are also encoded using random numbers to further secure the system.

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Computer to computer communication.

Communication is a vital aspect of our Red Boxes system.

Controllers are not isolated from one another – they are connected with each other, through the mains borne system and so communicate with each other and with Red Leader. If Red Two sends a message to Red Leader indicating an intruder, Red Leader responds by telling a switch unit to activate the alarm.

If you operate two home computers, they can communicate with each other through the system, enabling you to set them more complex tasks. And because Red Boxes have integral micro computers, this leaves your home micro free for normal use outside Red Boxes programming.

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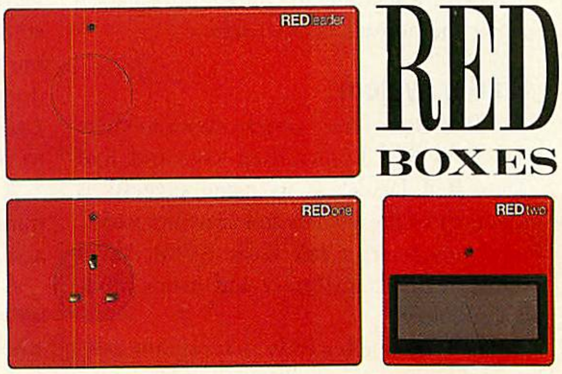
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I enclose a cheque for a total of £________ made payable to General Information Systems Ltd. Readers' Account.

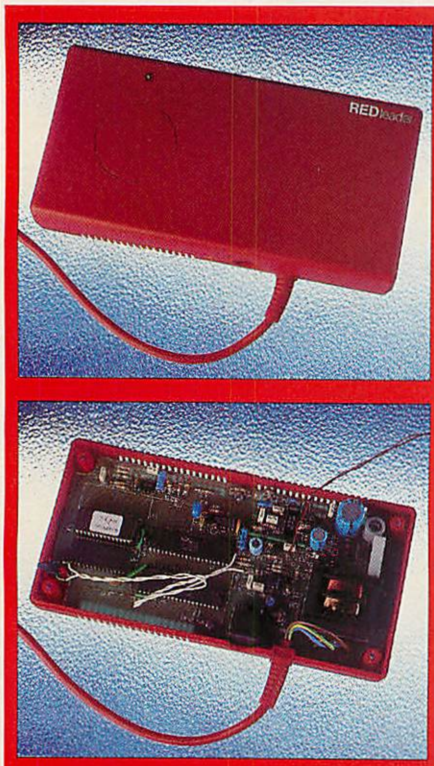
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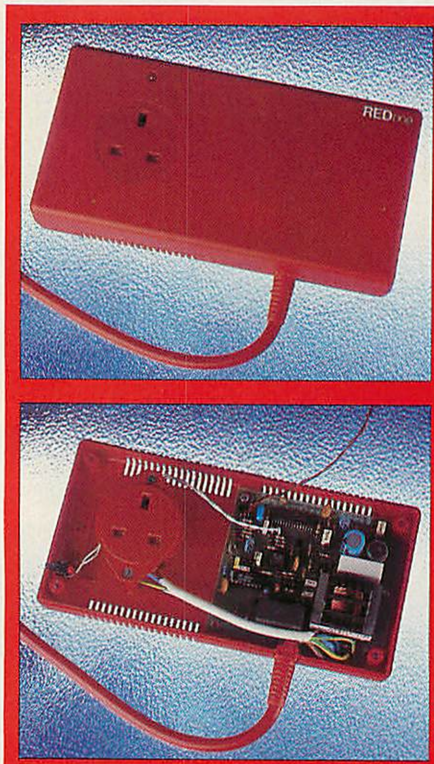
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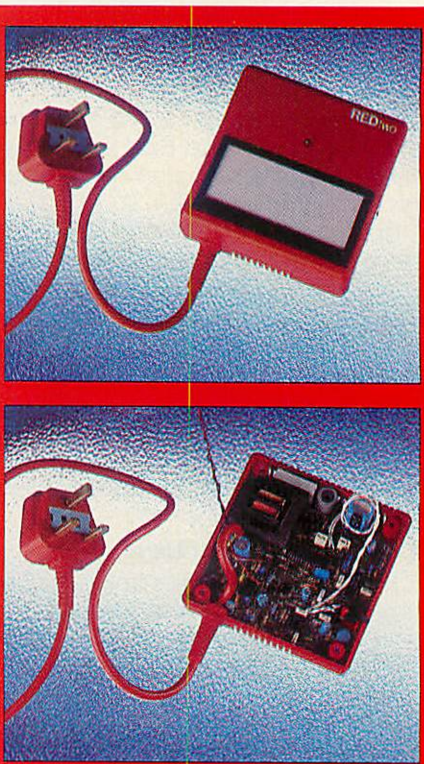
Enquiries on technical specifications and special applications, contact the address above.



Red Leader: centre of the system. Programming is via your micro, and Leader then controls other Boxes



Electrical appliances are switched by Red One, communicating with Leader via a ring main carrier modulation



Detecting movement: Red Three. Red Leader processes output and instructs Red One to switch on socket

HARDWARE

RED ALERT

A system for remote control of devices via the mains is tested by Bruce Smith

Most readers have at some time imagined plugging something into their micro to control an electrical device. However, very few people actually get around to doing it. I made a few vain attempts with my Atom years ago, which I had bought to control a telescope in the garden. I can say with all certainty the reason this grand project was never completed was the complexity and effort involved in wiring and soldering – not to forget programming. And, of course, your computer is tied up all the time controlling the whole thing.

General Information Systems (GIS), the brainchild of Acorn co-founder Chris Curry and staffed by many ex-Acorn employees, has launched a set of products known simply as Red Boxes.

Red Boxes allow a BBC micro to control electrical appliances all around the house. The need for complicated wiring has been avoided by sending all control information along the house's mains cables.

Starter system

The Red Box starter system contains three devices – Red Leader, Red One and Red Two. Red Leader as its name suggests is the heart of the system and contains a 6502 microprocessor, a 16k Basic ROM, 8k of RAM, mains transformer and mains modem circuitry.

Red One is effectively a computer controlled mains socket. Plug Red One into a mains socket and any domestic appliance rated up to 13 amps can be plugged directly into the socket on Red One. By programming Red Leader, Red One can be switched on and off as required, activating the item plugged into it.

Red Two contains a sensor which can detect movement through changes in the heat level in the area covered by its field of view. It can detect the human body up to several feet away and could be used for burglar alarms and switching on lights. It does this by sending a message to Red Leader which in turn will activate Red One to perform the task.

A single Red Leader will control any number of Red Ones, Red Twos and associated mains appliances.

A simple application of the Red Boxes kit could be to use Red Two to determine when someone enters a room and get Red Leader to cause Red One to switch on a lamp. This is very easy to do and to my great amusement, I recently spent most of a Saturday evening walking in and out of a room doing just that.

Menu program

So now we know exactly what they are, how do they fare in proper use and how do you program them? The first thing you need to do is plug Red Leader into a suitable mains socket and then connect it to your BBC micro via the RS423 serial port – a lead of suitable length is supplied for just this purpose. With the micro on you type:

```
*FX2,1
```

press Return and switch Red Leader on and within a few seconds the Red Leader menu screen is presented and you are ready to start.

The next task is to install the other devices. Figure 1 shows the menu screen after Red One and Red Two have been installed. The process is simple: press N for New and you are asked to enter a name for the device. Suppose we had a lamp plugged into Red One, we could respond with Lamp. Now any reference to Lamp will access that particular Red One controller. As each device is entered it is also allocated a device number.

To allow the correct device to be accessed, each Red Box has an identification number which the menu program then

PHOTOGRAPHS BY JAMES JOHNSON

requests. The device is now ready for use. Red Two can be installed in the same way, and all devices can be activated directly from the menu by moving a bar up and down the list. Press S for Set and then type ON or OFF. The selected device will then be switched on or off as instructed.

The times at which devices are activated can also be programmed from the menu screen. On and off times can be specified and unless an R is inserted into the Repeat column the device will not repeat each day. The time itself is set using the C option, and works on a 24-hour clock.

With all your devices installed pressing G for go will set all your programming into operation with Red Leader left in control – you can disconnect your micro and use it for other things.

All Red Boxes have a small override button so that any appliances attached to a Red Box can still be manually operated.

Red Basic

The menu program itself is written in Red Basic and studying this gives a good insight into the sort of things possible. Red Basic is remarkably similar to the original BBC Basic, although getting to grips with the variety of new commands requires a little bit of practice. The 50-page manual accompanying the Red Boxes pack is in general quite good. However, an amazing omission is the total lack of programs written in Red Basic to demonstrate the system's potential. We'll look out for Red Basic listings from readers to carry on the yellow pages in the future. Table 1 lists the commands available in Red Basic.

Most of the menu options described in the menu program have their direct counterparts in Red Basic. Controlling devices from Red Basic is easy: if the device is called Lamp you simply use the command:

TELL ("LAMP", ON)

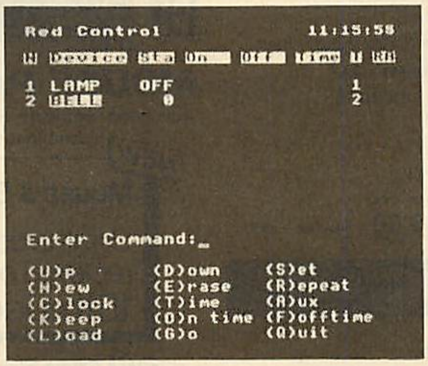
or:

TELL ("LAMP", OFF)

New devices can be added at any time with the install command, and removed with erase. A very interesting command which would have been worthy of inclusion in any language is every. This is followed by a number which is expressed in fiftieths of a second. When Red Basic encounters this command it will execute the instructions in the program up to the continue command every period of specified time. In short you have a very easy-to-use interrupt driven, multi-tasking sequence of commands. For example the line following line will cause the current time to be displayed once a second:

Commands
CLEAR, CLS, CONTINUE, DATA, DIM, DRAW, ELSE, END, ERASE, ERROR, EVERY, FOR, GCOL, GOSUB, GOTO, IF, INK, INPUT, INSTALL, LET, LIST, LOAD NAMES$, LOAD VARS, MENU, MODE, MOVE, NEXT, ON, PAPER, PLOT, PRINT, READ, REM, REPEAT, REPORT, RESTORE, RETURN, RUN, SAVE NAMES$, SAVE VARS, STOP, TELL, THEN, TO, UNTIL, USR, WHEN

Functions
ABS, ASC, CHR$, DATE$, DAY$, DEVICES, DEVNUM, ERL, ERR, EVAL, FALSE, FREE, GET, GET$, INKEY, INKEY$, LEFT$, LEN, MDAY, MID$, MONTH, MONTH$, NAME$, NOT, OFF, ON, POINT, POS, RIGHT$, RND, SCREEN$, SGN, SPC, STATUS, STR$, STRING$, TAB, TIME$, TOP, TRUE, TYPE, VAL, VPOS, YEAR



Top, table 1 shows commands available in Red basic. Below, figure 1 shows menu screen after installation

EVERY 50 PRINT TIME$:CONTINUE

Similarly, the line:

EVERY 100 GOSUB update:CONTINUE

will call a subroutine called update every two seconds.

Once you have written a program in Red Basic you can set it running and unplug it from your computer which you can then use for other tasks. Remember Red Leader has 8k of RAM in which your programs are stored. When you hook Red Leader to your micro it simply downloads a terminal program, so in effect your BBC micro is simply a terminal! It also means that, by installing some new terminal code in the ROM, Red Boxes can be used on most home micros. A new ROM is planned for the Electron and Red Boxes will work on the Master and the Compact, though the manual omits to tell you to enter:

*CONFIG. BAUD 7

So if you have Master Compact ensure you do this first of all.

System expansion

The Red Box pack could be considered as a starter pack – and not surprisingly GIS has a whole host of goodies on the horizon to build up your system. One of the first of these will be an analogue to digital convertor. This will give you the facility to control mechanical equipment and also read the state of analogue devices.

The hobbyist market is also being investigated and there could be kits emerging for brewing and a burglar alarms – no doubt to be christened Red Nose kit and Red Alert respectively!

To my mind one of the most useful new boxes will be the RS box. If you have more than one BBC micro at home, plug an RS unit into each and they will be able to send data to each other via the mains at a respectable 2400baud.

Other useful applications that spring to mind include the use of an auto-answer modem. Ring up from the office and send the data down the line to switch on a light, slow-cooker, heating or whatever.

When you have devices operating in this manner, security is of the utmost importance. In flats, terraced houses and semi-detached houses it is probable that there will be a common or semi-common ring main. Therefore if several people were using Red Boxes it is possible that data could be intercepted, altered or trapped. A unique double random number encoding system has been built into Red Boxes that virtually rules out all possibility of this happening. To quote GIS staff, 'the CIA might just be able to crack it, but no hacker could'.

Recommended

There are not a lot of computer related products that I go particularly overboard about – but this is one of them. I think I can best sum up my feelings by saying this is one of the few products I would actually go out and spend my own money on, and I am lucky enough to get a lot of kit free or very cheaply.

Red Boxes will allow you to automate your home very easily and at a modest price. The industrial applications are limited at present, but that will probably change. As educational devices for the study of control they are like Lego – easy to use and do a first rate job.

If you're not really into control then I think you would still gain a great deal of enjoyment in playing around with them.

For Mums and Dads looking for Christmas gifts this is the present of the year – I might even buy the wife a set. I mean she doesn't really want that mink, does she?

Red Boxes starter system, £129. Extra Red One and Red Two boxes, £34.95 each. Details from Electronic Fulfilment Services Ltd, Chesterton Mill, French's Road, Cambridge CB4 3NP.

SOFTWARE

NEW ROMS FOR OLD

David Atherton tries out and tests Advanced Computer Products' DFS ROM

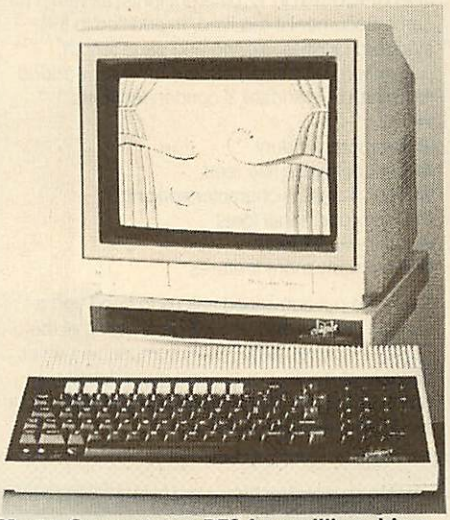
Advanced Computer Products (ACP) has released a disc filing system (DFS) ROM chip for the 1770-based model B or B+ (product code ADB), Master 128 or Compact (ADM) and disc-based Electron (ADE). For this review I used ADM on a Master 128 and a Compact. Incidentally, I had no problems using this disc filing system with 3.5in discs, despite warnings from Acorn about DFS gap sizes being too small on 3.5in media.

The ROM contains all the standard DFS commands, messages and layouts as the Acorn 1770 version, and discs are interchangeable between the two. (Both products were written by the same author.) The only differences I spotted were on an 80 column catalogue layout and an 'Aborted' message if you say no to a format, backup or other drastic command.

There are some extra commands. *WORK allows loading and saving throughout a session without referring to a filename. *FILES gives the channel number (in hex), PTR and EXT values of any open files. *MAXFILES varies the number of open files available between zero and 10. On pre-Master machines, the higher the number, the higher the value of Page. The default is five files which sets Page to &1900. Finally, the ADB and ADE offer versions of the new filing system commands from the Master – *APPEND, *CREATE and so on. The 8271 emulation is at least as good as the Acorn DFS. I had no trouble loading several protected discs.

However, the real utility of the ACP disc filing system comes in the formats it offers. You can have any combination of single or double density discs, one or two surface cataloguing, and 31 or 62 filenames per catalogue.

Double density mode is controlled by *OPT 5 and must be selected before formatting and use. Automatic density sensing can be set, but this will slow down access times. ACP have had requests for automatic sensing to be the default condition, and current ROMs have this. Under double density there is a 60 per cent increase in space, so an 80 track surface contains 320k. The two-surface format is very useful for programs like *ViewStore* which insist that all their files are on the same surface, but ideally need the space of both sides of the disc. The advantages of 62 files catalogues need no explanation!



Master Compact: use DFS for auxilliary drives

For BBC B+ 128k, Master and Compact owners, there is another bonus – a 64k RAM disc using the sideways RAM. This works at about 10 times the speed of discs for LOAD, SAVE, CHAIN etc, and about three times the speed for byte access. If you access files through OSGBPB rather than byte access (BPUT/BGET) then the speed increase is a mind-boggling 100 times! In all the RAM disc tests I carried out, everything except byte access seemed instantaneous.

After 'formatting' the RAM disc, it is selected as *DRIVE 8, but *SRDRIVE can make it appear as other drive number. A *SRDRIVE 0 will make Shift-Break do a boot from RAM disc.

Many commercial packages have less than 64k of code and *COPY 0 8 *.* will copy them quickly into RAM. When using packages which keep a file only partly in memory, the RAM disc dramatically improves performance. The RAM disc will work with other types of sideways RAM, but only the first 16k is recognised. ACP is looking at 'popular alternative systems over 16k', which I guess means Solidisk.

Also, for those few who have fitted a second pair of disc drives to the Master's internal connector pads, this DFS support drives four to seven as separate from drives zero to three.

ACP claims a considerable speed improvement over Acorn's disc filing system, and my own tests bore out the claims that the DFS runs at about the same speed as Acorn's for LOAD-SAVE, and nearly twice the speed for byte access. These are the routines used most often. Increasingly, commercial software is using the OSGBPB call, and this runs virtually as fast as LOAD, or eight times the speed of Acorn DFS. PTR movement, which features in databases, happens seven times as fast as on Acorn DFS. These timings are all for single density. Double density is about 15 per cent faster.

The final feature that you never notice, but you would if it wasn't there, is file relocation. This avoids the notorious 'Can't Extend' problem, which all Acorn DFS users have met to their cost. It doesn't happen with this DFS. A file just gets put elsewhere on the disc, and the other files are shuffled around. If there really isn't enough room, a 'Disc full' error occurs.

The 80-page manual documents all the commands in a similar style to Acorn's own DFS manual. Detailed technical information on how to drive the DFS at assembly language level, and on the catalogue structure, is also there.

In using the DFS, I couldn't find any bugs other than a tiny one (now fixed by ACP), where *RUN after *OPT1,2 displays the wrong filename.

To summarise, this DFS is a lot better than Acorn's. For Compact and Electron disc users it's a must, and other BBC micro owners should consider it carefully.

Advanced 1770 DFS £34.50 including VAT. Further information from John Huddlestone, Advanced Computer Products, 6 Ava House, High Street, Chobham, Surrey GU24 8LZ. Tel: (0276) 76545

SOFTWARE

OVER THE WATER

Martin Cooper runs up his phone bill by examining two packages to enable British BBC micro users to enter French videotex

While politicians talk smugly about Britain's information technology lead, across the Channel a second revolution has taken place. Much quieter than the first, the only casualty has been the old printed telephone book, but it has left France an undisputed world leader in the field of videotex.

Fortunately, BBC micro owners can join in – as spectators at least – using two new software packages. Both are terminal emulators, making it possible to log on to Teletel, the French videotex system, from the UK, using a standard 1200/75 modem.

But first a few words about Teletel. Like Prestel, it is a page-based public viewdata service, and the resemblance is carried over into the pages which have the same 40-column format and graphics.

In terms of size, however, there is no comparison. While Prestel strains towards 100,000 users, Teletel already has well over two million. Some of its information providers maintain databases that are actually larger than Prestel.

Teletel is unlike Prestel too, in that it provides no service itself. It merely acts as a gateway to more than 1200 host computers ranging in size from micros to large minis. Roughly 65 per cent of the pages they supply are openly available, with no subscription or password. These are the 'kiosque' services – so called because it is as easy to use them as it is to buy a newspaper from a news stand.

The contents are familiar, news, sport, small ads, quizzes (many rather risqué!) and messaging services ranging from mailbox systems to something very like Micronet's Chatline. (In French, of course; quite a challenge.)

One thing conspicuously absent is telesoftware. This is because the majority of users access the system using purpose-built terminals rather than micros. The 'Minitel' is the key to Teletel's phenomenal growth – it is given away free to anyone who agrees to forgo the old-fashioned 'phone book and use an on-line database of telephone subscribers.



One of the pages that can be accessed on Teletel

The structure of Teletel has been shaped by the Minitel in exactly the same way as early receivers shaped Prestel. Most Prestels sets only had numeric keypads, hence our rather unwieldy system of page numbers. Minitels, on the other hand, all have alphanumeric keyboards. When you log on, you type in the name of the host you want to access and from then on movement round the database is by a combination of menus and keywords.

At first sight, the teletext chip makes the BBC micro an ideal machine on which to run a Minitel emulation. Unfortunately, appearances are deceptive. The mosaic graphics on the French system may look familiar but there is an additional character set of line graphics and any character can be displayed double width as well as double height. Add an extra colour and all those accents and you've got problems.

The main difficulty, however, lies in the fact that the French system does not use teletext-style control codes. This means that mode 7, with all its memory advantages, is out of the question.

Harrogate College of Arts and Technology have opted for mode 4 in their disc-based package *Collnet*. Although it is the least memory-hungry of the BBC micro graphics modes, mode 4 does have the disadvantage of providing only a two-colour display, which means that a little of the detail is lost on some graphics pages.

Colour apart, the full Teletel specification is achieved. There is a screen save option and pages stored on disc can be re-displayed after logging off to be dumped to an Epson-compatible printer.

This is a good, workmanlike package for anyone who only wants an occasional taste of Teletel. It is very simple to operate, and comes with a useful leaflet outlining the structure of the French system.

Aldoda International's *T* is a more ambitious ROM-based package for the heavy user. It employs the four-colour mode 1, with a 'smart algorithm' to make colour combinations as attractive as possible. Pages can be saved, then redisplayed off-line and dumped to an Epson, but a fast text-only option is also available for printing on-line.

Commands to an intelligent modem can be issued from within the emulator and the default communications settings can be changed. Function keys can be re-defined to handle automatic log-on or to access frequently used pages automatically.

A friendly manual contains good advice about dialling Teletel direct and information about PSS options and even a short data dictionary of French buzzwords.

Anyone who wants to experiment can log on to Teletel's Kiosque services on 010 33 36 43 15 15. Settings – 1200/75, 7 bit, even parity. Databases to try: JEUTEL, FUNI, OBS and GRETEL. Bonne chance!

Collnet is available from the Computer Unit, Harrogate College of Arts and Technology, Haywra Crescent, Harrogte HG1 5BE, Tel: (0423) 505631 Ext. 30. Compatible with BBC B/B+/Master, £19.95.

T, from Aldoda International, 201 Haverstock Hill, London NW3 4QG, Tel: 01-794 0991, Prestel: 017944999, Gold: 72:DTB10179. Compatible with all Acorn computers, £28.50 ROM, £27 disc.

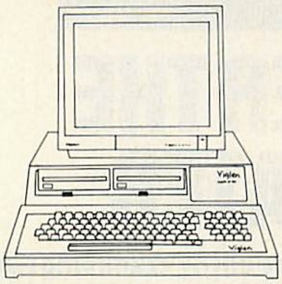
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Viglen

SYSTEMS



COMPLETE SYSTEMS FROM VIGLEN

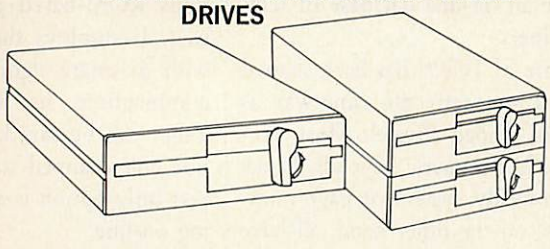
The following systems come complete with the BBC Master and drives fitted in the Viglen Master Console unit.

Stock Code	Description	Price Inc. VAT
V250	Viglen Master System 1 This system includes: BBC Master 128K in Console unit Single 400K (760K double density) 40/80 disc drive. Philips BM7502 Hi Res Green Screen Monitor	£689.00
V251	Viglen Master System 2 This system includes: Dual 800K (1520K double density) 40/80 disc drive Philips CM 8501 Standard Res colour Monitor	£879.00

Other systems can be taylor made for your requirements 3½" drive can be supplied instead of 5¼" at the same price. Please call.
To complete the system you only need to add a printer from any of the range. The current special offer printer that's particularly suited to the packages is the Centronics GLP at £119.95 inc. VAT.
Please add £12.00 for insured courier delivery.

DISC DRIVES

BBC MICRO & MASTER COMPATIBLE DRIVES

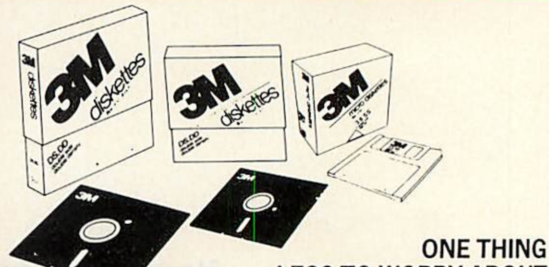


All disc drives are supplied with a manual, packed utilities disc and a full 12 Months warranty (2 Year Warranty available) and are ready to plug in and use on a BBC B (fitted with a DFS) B + or Master micro.
40/80 Track drives have a switch which enables operation in either 40 or 80 track mode.
The capacities quoted are given in single density mode; for double density mode (1770 DFS + ADFS as in the Master) the capacities should be approximately doubled.
An integral power supply is not necessary as the disc drives run from the micro's power source however should you require drives with their own power supply please add the price of the integral power supply to the price of the drive.
If your BBC B micro does not have a DFS fitted then you will also require the Acorn dfs kit.

Stock Code	Description	Price inc. VAT
V014	Single 400K Viglen 40/80 Track Drive	£115.00
V019	Dual 800K Viglen 40/80 Track Drive	£215.00
V001	Single 100K TEAC 40 Track Drive	£89.00
V004	Single 400K TEAC 40/80 Track Drive	£139.00
V005	Dual 200K TEAC 40 Track Drive	£178.00
V008	Dual 800K TEAC 40/80 Track Drive	£278.00
V020	Single 400K Mitsubishi 40/80 Track Drive	£129.00
V021	Dual 800K Mitsubishi 40/80 Track Drive	£258.00
V060	Single 3.5" 400K Viglen Drive	£109.00
V061	Dual 3.5" 800K Viglen Drive	£218.00
V096	Integral power supply for single Drive	£19.00
V097	Integral power supply for dual Drive	£24.00
V095	Integral power supply for 3.5" Drives	£24.00
V098	External power supply for dual Drives	£29.00
V502	Acorn 1770 dfs kit or 1.2 DNFS	£49.95
V503	Acorn ADFS Rom	£29.95

Please add £12.00 for insured courier delivery.

FLOPPY DISCS



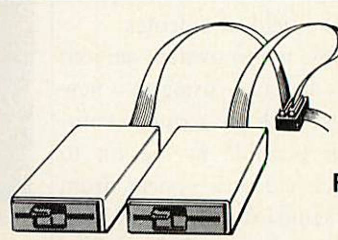
ONE THING LESS TO WORRY ABOUT

3M Scotch Floppy discs all have a lifetime guarantee; Each box contains 10 discs.

Stock Code	Description	Price inc. VAT
V110	3M 40 track single sided (744 SS, DD)	£11.50 (per box)
V111	3M 40 track double sided (745 DS, DD)	£13.80 (per box)
V112	3M 80 track single sided (746 SS, DD)	£19.50 (per box)
V113	3M 80 track double sided (747 DS, DD)	£19.50 (per box)
V114	Special offer 80 track double sided	£16.00 (per box)
V135	3M 3.5" 80 track double sided (3.5, DS)	£31.00 (per box)
V136	3M 3.5" 80 track double sided (3.5, DS)	£3.50 (Each)

Please add £2.00 P & P.

DUCKS



DUAL DRIVES FOR LESS THAN £17!

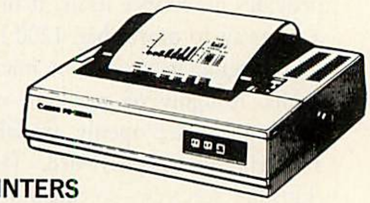
The Viglen Data DUCK (Dualling Up Connector Kit) converts any two single drives to a dual drive instantly. Simply plug the duck into the micro's disc drive socket and plug two single drives (any type and any make) into the duck to obtain a dual drive system accessed as drive 0 (and 2 if double sided) and drive 1 (and 3 if double sided). If neither single drive has its own power supply then you will require a Viglen power DUCK in order to obtain two disc drive power sockets from the micro.

★ No soldering simply plugs in.
★ No need to take disc drives apart to change links.

Stock Code	Description	Price inc. VAT
V084	Viglen data duck	£16.95
V085	Viglen power duck	£8.00

Please add £2.50 for P & P.

PRINTERS



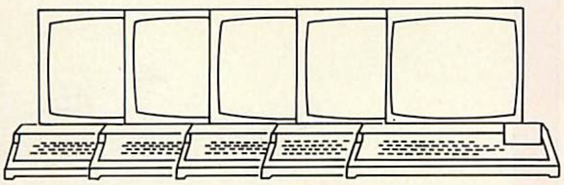
DOT MATRIX PRINTERS

Stock Code	Description	Price inc. VAT
Dot Matrix Printers		
V410	Canon PW1080A/TaxanKP810	£239.00
V409	Centronics GLP	See Special Offer Box
V420	Epson LX86 with tractor feed	£269.00
V421	Epson FX85	£379.00
V422	Epson LQ800 (200 cps)	£559.00
Daisywheel Letter quality printers		
V400	Juki 6100	£279.00
Ribbons		
V462	Canon PW1080A/Taxan KP810 ribbon	£5.95
V463	Epson MX80/RX80/FX80/FX85 ribbon	£6.00
V464	Centronics GLP ribbon	£3.95
Printer cables		
V495	BBC micro/ Master printer cable	£8.00
V497	Master Compact printer cable	£8.00

Please add £8.00 for insured courier delivery and £1.50 for ribbon.

THE VIGLEN RANGE

MICROS



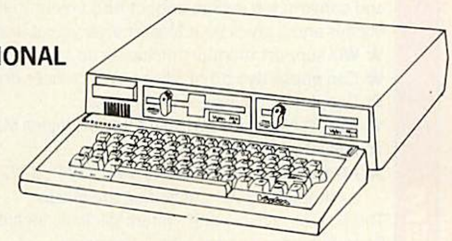
BBC MICROS

Stock Code	Description	Price inc. VAT
V210	BBC Master 128K	£459.00
V204	BBC Master COMPACT entry system	£442.75
V205	BBC Master COMPACT TV system	£458.00
V206	BBC Master COMPACT Monochrome system	£539.35
V207	BBC Master COMPACT Med Res Colour sys	£688.85
V208	BBC Master COMPACT Std Res Colour sys	£649.00

Please add £8.00 for insured courier delivery.

BBC CONSOLE UNIT

VIGLEN PROFFESSIONAL CONSOLE UNIT



Your BBC micro can be given the professional PC-look by replacing your existing lid with this smartly styled package which can house two disc drives, the Viglen Rom cartridge system, most internal boards and can support monitors including 14" television sets.

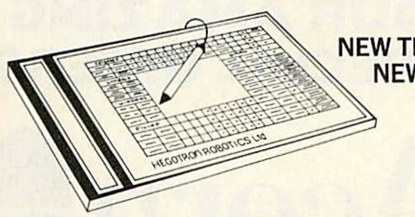
PCU Package includes: Keyboard case, Metal screened main unit, casing including internal fittings, 2 meter coiled cable to connect main unit to keyboard, Blanking plates to blank, out disc drive apertures, Keyboard label.

Other accessories are also available including units fitted with single or dual drives.

Stock Code	Description	Price inc. VAT
V851	Viglen Professional Console unit for the BBC micro (PCU)	£49.00
Accessories for the Professional Console unit		
V852	2 Meter coil cable on its own	£15.00
V853	Dual drive data cable for console unit	£9.00
V853	Dual drive power cable for console unit	£5.00
V855	Power supply for PCU (capable of running two 1/2 height drives)	£32.00
V856	Fan kit for PCU (only necessary if your BBC normally gets extremely hot)	£35.00
V857	Extension keyboard on its own including coiled cable.	£29.00
V858	Fitting bracket for 3½" drive	£9.00
	Fitting service available from	£15.00

Please add £6.00 for courier insured delivery.

GRAPHICS



NEW STYLE. NEW TECHNOLOGY. NEW SOFTWARE.

GRAFPAD 2

The Grafpad 2 is the ultimate in graphic input devices and includes a new powerful art package allowing you to draw and paint in numerous colour and pattern combinations. Other facilities include copying, inverting, mirror imaging and flipping any part of your picture. The software comes on Rom and disc.

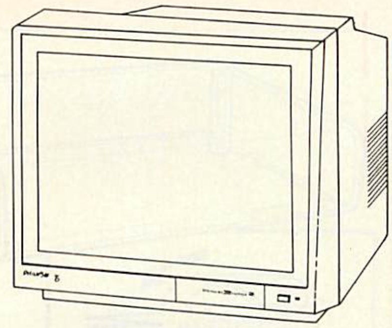
It's fast, easy to use and all commands are selected directly from the tablet, even text and numerics. Just point the pen and click the switch.

Resolution: 1280 × 1024 pixels.

Stock Code	Description	Price inc. VAT
V568	Graphpad 2	£75.50

Please add £8.00 insured courier delivery.

MONITORS



COLOUR & MONO

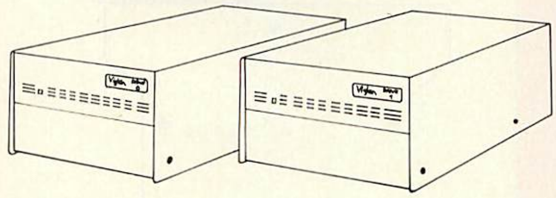
All the following monitors are supplied with a cable to fit the BBC micro/ Master and Compact.

Stock Code	Description	Price inc. VAT
Monochrome Monitors		
V331	Philips BM7502 Hi Res Green	£85.00
V332	Philips BM7522 Hi Res Amber	£95.00
V333	Taxan KX1201 Hi Res Green	£89.00
Colour Monitors		
V335	Philips CF1114 14" Colour TV/Monitor	£174.95
V345	Philips CM8501 Std Res Colour Monitor	£179.00
V346	Philips CM8533 Med Res Colour Monitor	£289.00
V300	Microvitec 1431 Std Res Colour Monitor	£219.00
V301	Microvitec 1451 Med Res Colour Monitor	£289.00
V304	Microvitec 1451APL Med Res Colour Monitor with PAL	£329.00
V302	Microvitec 1441 Hi Res Colour Monitor	£425.00
V356	Taxan Super Vision II	£299.00
V357	Taxan Super Vision III	£369.00

Please add £8.00 for insured courier delivery.

WINCHESTERS

MEGA BYTES FOR MINI BUCKS



Plug in 20 to 112 Megabytes of extra storage with the Viglen Winchester system.

The Viglen Winchester is ready to plug in and use on a BBC Master micro; for a BBC B or B plus you will merely need to fit the Acorn ADFS Rom. The Winchesters are 100% compatible with the Acorn Winchester and Acorn ADFS and will also work with the Acorn Master 512 board with DOS plus.

Drive 1 Winchesters are also available for backup or just more storage and simply plug into the back of the Drive 0 unit.

The Winchester package consists of: Winchester unit (cased with controller boards, power supply and fan), Master reference Manual part 1, Winchester user guide and Winchester utilities on disc (such as formatter, verifier, ADFS menu and sophisticated backup program allowing you to make fast backups on DFS discs, ADFS discs or Drive 1 Winchester.)

Stock Code	Description	Price inc. VAT
Drive 0 Single		
V150	VB20 20Meg Viglen Winchester	£759.00
V152	VB28 28Meg Viglen Winchester	£799.00
V155	VB40 40Meg Viglen Winchester	£1045.95
V156	VB56 56Meg Viglen Winchester	£1119.95
Drive 1 Second Drive		
V160	VB120 20Meg Drive 1 Winchester	£599.00
V162	VB128 28Meg Drive 1 Winchester	£649.00
V165	VB140 40Meg Drive 1 Winchester	£819.95
V167	VB156 56Meg Drive 1 Winchester	£899.95
V503	Acorn ADFS Rom and Manual (Only necessary for BBC B or B Plus	£29.95

Please add £8 for insured courier delivery.

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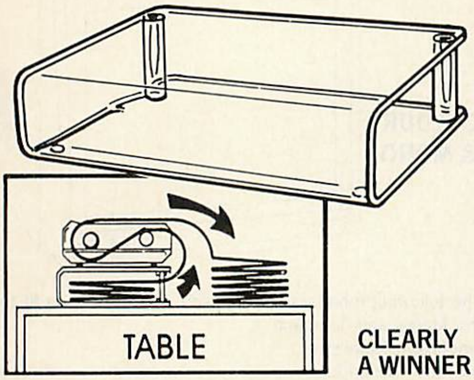
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SALES HOTLINE 01 843 9903

Viglen

PRINTER STANDS



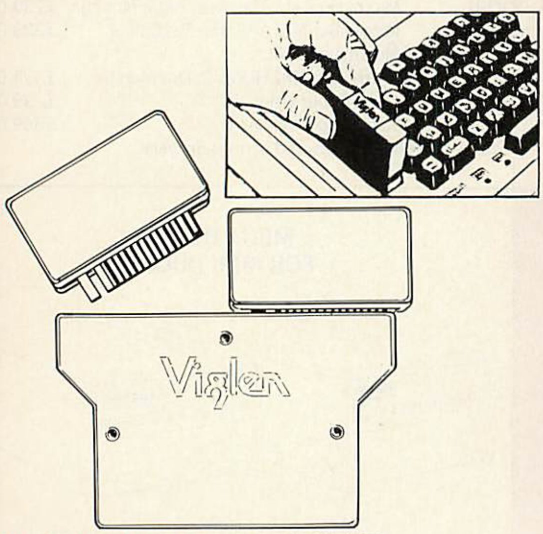
CLEARLY A WINNER

The Viglen printer stands are beautifully finished in clear perspex and raise the printer high enough to put continuous stationary underneath.

Stock Code	Description	Price inc. VAT
V490	80 Column Printer Stand (15″ × 13″ × 3.5″)	£19.95
V491	136 Column Printer Stand (23.5″ × 13″ × 3.5″)	£27.95

Please add £3 P & P

CARTRIDGE SYSTEM



VIGLEN ROM CARTRIDGE SYSTEM

Having fitted the Viglen Rom cartridge system to your BBC, Master or Master COMPACT, you can plug in your Roms/Eproms simply by inserting each one in a Viglen cartridge and plugging in whichever cartridge you want to use. The same Viglen cartridge can be used on all the micros mentioned and there is no need to switch the micro on and off between cartridge changes.

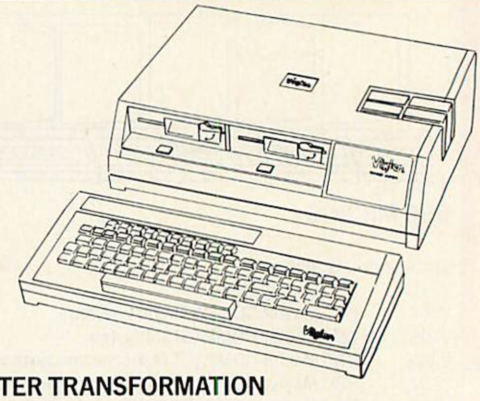
The Viglen cartridge system for the BBC micro consists of the cartridge cable assembly and socket, blanking off plates, 1 cartridge and cartridge storage rack. The cartridge socket when fitted protrudes from the rectangular slot on the left of the keyboard where the cartridges are subsequently inserted. It is simple to fit and requires no soldering.

The Viglen cartridge system for the Master and Master COMPACT simply plugs into your Master cartridge slot (or COMPACT expansion port) and accepts two Viglen cartridges. On the Master you can plug in up to two Viglen cartridge systems thus giving you access to 4 Viglen Cartridges simultaneously. The system comes complete with 2 cartridges and cartridge storage rack. On the Master you can also use Viglen cartridges which have 32 and 64K paged Roms inserted.

Stock Code	Description	Price inc. VAT
V560	Viglen Rom cartridge system for BBC	£12.95
V559	Viglen Rom cartridge system for BBC (low profile)	£12.95
V550	Viglen Rom cartridge system for Master	£14.95
V551	Viglen Rom cartridge system for COMPACT	£14.95
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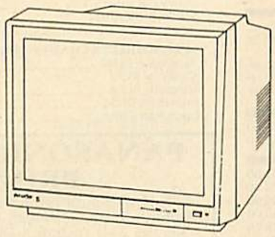
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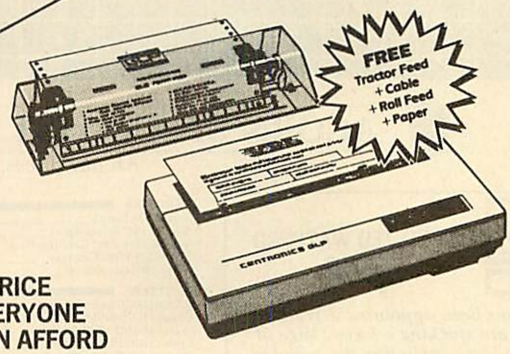
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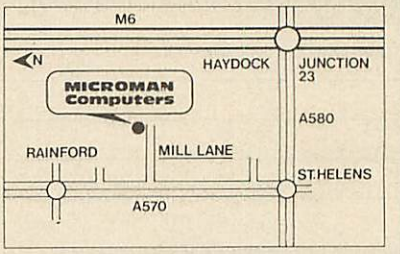
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WORD WISER

The TVEI *Wordwise* Training Pack and Pen-Friend, a ROM for making *Wordwise +* easier to use, are assessed by Patrick Quick

The *Wordwise* Training Pack

The TVEI *Wordwise* Training Pack is intended to be used mainly by teachers to teach themselves wordprocessing or by trainers teaching wordprocessing to teachers. Having said that, it could just as easily be used by anyone to learn wordprocessing with *Wordwise*; the only teacher-specific bit seems to be the short section in the 'Companion' booklet justifying the learning of wordprocessing.

The pack was produced by teacher trainers, principally at Jordanhill College of Education, and many Educational Institutes and educators are mentioned as contributing in some way. It aims to cover all versions so far of *Wordwise* and *Wordwise +* and to cater for all versions of the BBC micro up to and including the Master.

The pack consists of five parts, first the 'Companion' booklet introduces the pack and the idea of wordprocessing. It provides an index to the whole pack and a glossary. It also suggests the best ways of using the rest of the pack.

The main part of the pack is an 'easel' style booklet. This is a spiral bound pack of flip-over exercise cards with an integral stand. The easel can be stood either way around, and reading from one end gives you 'Easel One' and from the other end the other sides of the cards comprise 'Easel Two'. Easel One starts from scratch and introduces you to using *Wordwise* and its basic wordprocessing facilities. Slightly experienced *Wordwise* users can start conveniently with Easel Two directly, which goes into layouts, print control, and briefly, segment programming.

The exercise disc, the third part of the pack and the only software, contains sample texts for the Easel's exercises. For use by complete beginners, perhaps it should have been write protected?

A spiral bound pack of reference cards provides more detailed information. Each of the 60 sides involves only one small topic. For example, page one covers auto-repeat, page 54 covers spooling of text.

Finally, the prompt card is a shiny, stiff, A4 card folded into three and containing brief reminders of main points such as embedded commands. I will keep this near my micro for my own use.

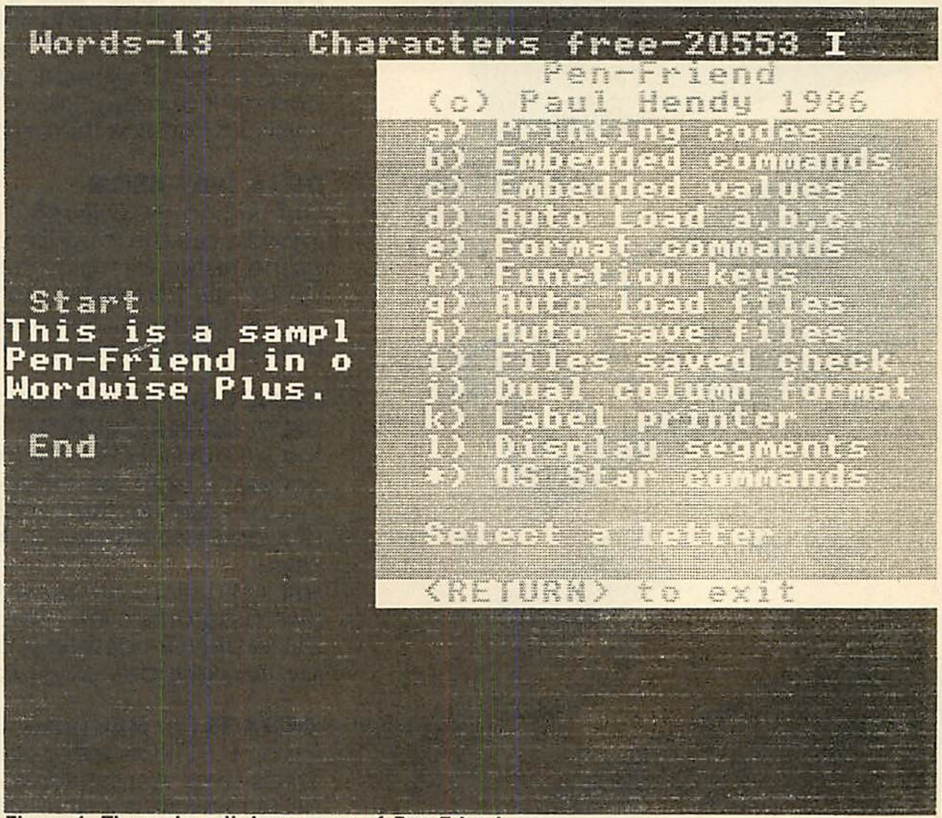


Figure 1. The main pull-down menu of *Pen-Friend*

The wide base of support during the development of this pack shows in its easily used and understood layout. Most information can be found quickly. The variety of media gives a flexible coverage for the different needs a range of types of users might have while learning wordprocessing at various levels. Most explanations are carefully and clearly worded. The training pack is very flexible and can be used with or without supervision by a wide range of people. In summary, the whole pack is well designed and represents very good value for money.

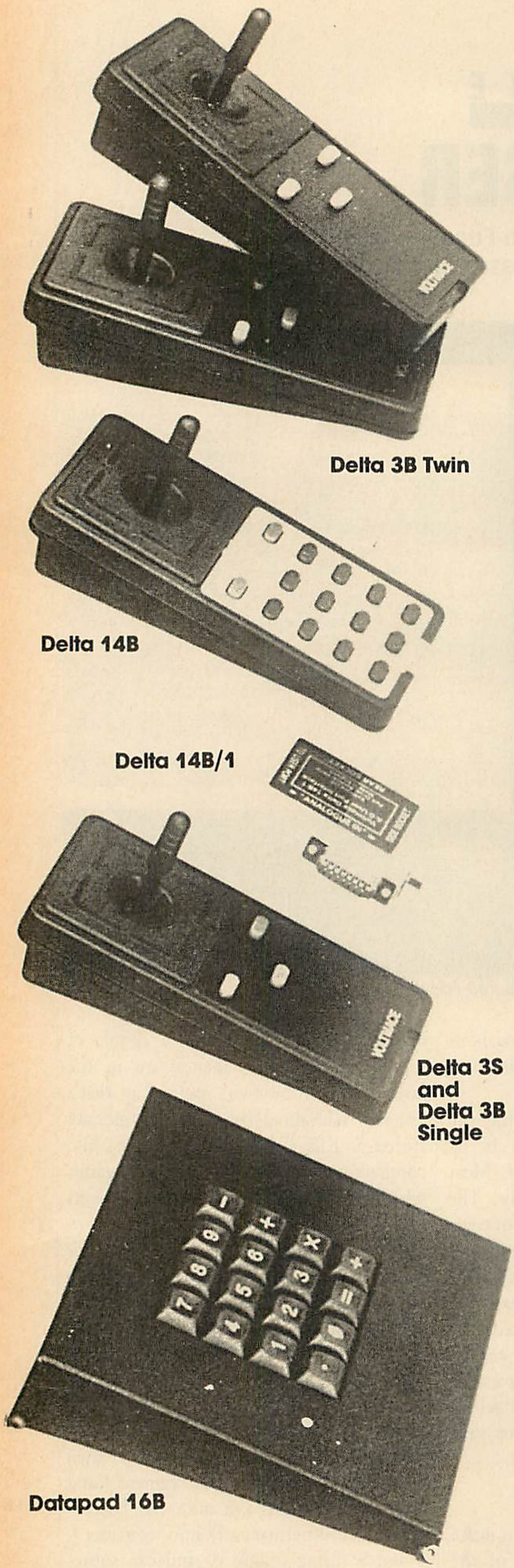
Pen-Friend

The *Pen-Friend* ROM is designed to make *Wordwise +* easier to use. Most of the formatting facilities of *Wordwise +* are available in quick and friendly form from menus. *Pen-Friend* also offers easier loading and saving of files and a couple of utility routines. The menus are in the fashionable 'pull-down' style, but that's not very relevant. Most of the routines are stored as RFS (ROM Filing System) files containing *Wordwise +* segment programs which are loaded from ROM into segments when needed.

The *PEN command starts up *Pen-Friend* and runs the main menu. The main menu is now stored in segment 0 and is available at any time while editing simply by pressing Shift-f0. Several of the main menu options contain additional submenus for further options.

The *Pen-Friend* routines are usually selected from the main menu which then loads them from ROM into segment 1 and runs them. Options a, b and c can, however, be loaded permanently into segments 7, 8 and 9 (using option d) and can subsequently be called directly by pressing Shift-f7. This gives a big improvement in speed with these often used options as RFS files

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are infuriatingly slow to load. The routines available from the main menu, some of which call up sub-menus, are these:

The routines

Option a inserts print control codes for underline, bold, etc. It uses OPS (output print string) commands so that the effects can easily be reprogrammed for a different printer. It also offers the facility to incude the correct RPS (redefine print string) commands at the start of your document to suit your particular printer. The codes for Epson and Brother printers are stored in the *Pen-Friend* ROM and sets of your own codes are easily selected from disc. Codes for the Juki 6100 are given in the manual in a clearly explained example.

Option b inserts embedded formatting commands. Fourteen of the most commonly used commands are offered in menu ($).

Option c displays the page formatting values at the current cursor position. Values such as page length and line length can be altered from this menu. Other values such as current page and line are displayed for information only.

Option d as described above loads options a, b and c into segments 7, 8 and 9 for faster use.

Option e shows a list of page format values, allowing you to edit them and them embed them all at the top of your document. As well as the default settings for normal continuous stationery, you can select the values for A4 or A5 sheets with a single key press. This option also allows you to create headers and footers and have the definitions embedded into your document. The header and footer editing is pretty primitive.

Option f reprograms the function keys from definition files you have created on disc or from the default file on the *Pen-Friend* ROM. Again clear examples are given in the manual.

Option g reads your disc or net directory and offers a choice of which file to load. This seems to be done in a 'legal' way and should work with all filing systems (but your disc system must be selectable by *DISC, network by *NET etc.). It is possible, if fiddly, to set up your disc to auto-boot into *Pen-Friend* and start up with option g. A small problem with this option is that the filename you load is not

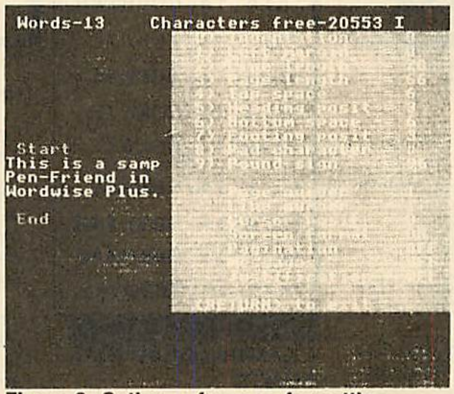


Figure 2. Option c, for page formatting

stored correctly with the result that when you use option h later the version number is not updated properly.

Option h saves your document, automatically updating the version number or letter. Unfortunately it only uses a single character for the version code, following 0 to 9 by A to Z, then a to z.

Option i verifies a saved file against the text in memory. A full comparison would be very slow so only the length and first character of each line are compared. This is still pretty slow as well as being insecure. It is safer to resave a document if you are unsure whether it is saved up to date.

Options j, k and l offer dual column formatting, label printing and display of the first line of each segment respectively. Unexciting, but they work and are useful.

The manual is printed well and generally clearly written with a feature being the excellent examples. A useful technical appendix gives a list of the segments and variables used and other notes.

Many of the default choices can be customised. For an extra payment of £10.50 per ROM you can have your own default choices programmed into the ROM in several places eg, the on-ROM printer definition files in option a can be changed for different printers. This is rather a good idea as most of the benefits of a ROM like this would be lost if the facilities were not instantly and easily available. I suppose larger organisations couldn't offer such personal service but perhaps *Pen-Friend* will set an example.

Compatibility

The ROM is fitted as usual, with the position being immaterial except that the higher its priority, the faster the options can be loaded. The RFS/segment program format means that *Pen-Friend* should work with all versions of the BBC micro and *Wordwise +*. The way the routines are written also suggests that they should work with any disc filing system. I have tested *Pen-Friend* with various versions of the Acorn DFS and Watford DFS and it seems to perform correctly.

Pen-Friend is claimed to be compatible with Watford's *Word-Aid* package, avoiding segments and variables used by *Word-Aid*. A different version is available which avoids clashes with Norwich's CP-ROM. The standard version uses some of the same segments as Beebugsoft's *Wordease*; in particular option c uses segment 9 where *Wordease* stores its main menu so that will definitely cause a clash (uless you reprogram your copy of *Wordease*!).

There is nothing absolutely earthshattering in this package but most of the options offer simple, useful facilities which take some of the grind out of wordwising. It's quite handy even for old hands like myself but would be most useful for newcomers who haven't learnt the arcance catechism of JOs and EPs nor know instinctively that OC27, 69 produces emphasised print on an Epson. The sloth of RFS files can be a bit irritating at times but with the main abc options in RAM this isn't too bad.

At first glance I felt that the facilities in *Pen-Friend* were trivial and it would be easier to learn the correct commands. Having used *Pen-Friend* while writing this review, though, I have found it eases many trivial tasks and leaves you freer to concentrate on your prose.

Pen-Friend has a different aim to the other *Wordwise* assistants reviewed in the May '86 *Acorn User* in that it only aims to help with normal wordprocessing and not with segment programming. It's reasonably successful in this aim and not too pricey. Combined with *Wordwise +* it creates a friendly and powerful wordprocessor.

Wordwise Training Pack is available from Jordanhill College of Education, 76 Southbrae Drive, Glasgow, G13 1PP and costs £28 (plus £2 postage and packing) inclusive of VAT.

Pen-Friend costs £14.95 inclusive of postage and package with no VAT to pay, from Word Processing, PO Box 67, Wolverhampton, West Midlands.

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Multi-Font NLQ comprises of MFNLQ ROM for the BBC, and utility disc containing the FONT definer, ten fonts, BASIC demonstration program, VIEW demo text file and Driver.
Multi-Font NLQ is compatible with nearly all software, including most BASIC programs, VIEW, WORDWISE & InterWORD (SCRIBE & Printer Buffer software currently not supported).

Ten fonts are supplied or create your own using the font definer supplied.

Fonts included are:-
Standard NLQ, Courier, Italic, Gothic, CompTS, Bold, Shadow, Outline, Broadway E, Theatre

Additional Font Disc MF 'B' contains:-
Hand, Script, Stencil, Broadway, Caps, Italic-Plain, Meccano, Plain, STD large, Wire, Greek/Maths and Inverse.

For Canon & Taxan Kaga users we recommend FONTAID in preference to Multi-Font NLQ.

Multi-Font NLQ (ROM and 40/80 Disc)	**£30.00**
Additional font disc 'MF-B' (12 fonts)	**£15.00**
Additional font disc 'MF-C' (15 fonts)	**£15.00**
P & P on MFNLQ	**£ 1.00**

NEW

MASTER Write Protect and ROM select switch. Two switches set to RAM slots to be:-
Internal ROM or RAM Read and Write or RAM Read only. £12.00 inc. VAT. P&P £1.00.

This is Standard
This is COURIER
This is ITALIC
This is GOTHIC
This is COMPTS
This is BOLD
This is SHADOW
This is OUTLINE
This is BROADWAY
This is THEATRE

EXAMPLE OF MFNLQ FONTS

FONTAID

NLQ Definer for Canon & Taxan Kaga NLQ Printers.

Design your own NLQ Fonts or 'download' one of our 40+ predefined fonts.

Fonts can be downloaded within Wordwise, Inter Word or VIEW Documents allowing different fonts to be used for different paragraphs, or even individual lines of text. During downloading your Program or Text will not be corrupted.

On the FONTAID standard font Disk are the following eight fonts:- Square, Outline, Italic, Gothic, Computer Type Style, Bold, Shadow, and Broadway Engraved.

Additional disc 'A' gives an extra 11 fonts including:-
Greek/Maths, Plain, Hand & (Elite, Condensed, & Super Condensed).

Now included is a facility to issue '*' commands within a VIEW document.
To download new fonts within VIEW documents, the FONTAID ROM needs to be fitted in the BBC. (All other FONTAID facilities are available on both the FONTAID ROM & DISC). Fonts are always downloaded from Disc.

Fontaid is recommended to Canon & Taxan Kaga owners in preference to Multi-Font NLQ. As downloadable NLQ is a built-in facility of the Printer, full access to all the printers control codes is still allowed. The resolution of the FONTAID NLQ is also slightly higher than that of Multi-Font NLQ.

FONTAID requires 6264 RAM chip in printer.

FONTAID ROM & STD Font disc	(40 or 80 track)	**£30.00**
FONTAID ROM & STD Font disc with 6264 RAM	(40 or 80 track)	**£36.00**
FONTAID Additional Font DISC 'A' (11 fonts)	(40 Or 80 track)	**£15.00**
FONTAID Additional Font DISC 'B' (13 fonts)	(40 or 80 track)	**£15.00**
FONTAID Additional Font DISC 'C' (15 fonts)	(40 or 80 track)	**£15.00**

FONT ROMS of individual fonts are available eg "Square".	**£18.00**
P & P on FONTAID	**£ 1.00**

INFORM

A UNIQUE NEW POWERFUL USE FOR SIDEWAYS RAM

NEW

INFORM has been developed specifically to take full advantage of the Sideways RAM facility that many BBC micro users now have. Inform is compatible with most SIDEWAYS RAM units including ATPL Sidewise with RAM, Solidisc SWR, BBC B PLUS 128K & BBC MASTER series (not SDL256)

INFORM is a very powerful facility, which allows the user to display text information, of any kind, from Sideways RAM. This information can be readily accessed by using '*' commands from the keyboard or from application programs. In this way, much information can be displayed on the screen without stopping the current task, such as entering text in WORDWISE or VIEW.

The information in the RAM can be changed dynamically at any time.

Some of the possible applications for INFORM are:–

An on screen help manual can be created for your application, so that a reminder about more obscure points can be displayed at the users request. Information on your program or datafile contents, can remind you of their purpose.

Address and/or telephone numbers can be held and displayed quickly even while other applications are running. Very useful if you need to quickly display information about a client while he is hanging on the end of a phone!

Current prices for your products or stock position can be recalled instantly and readily modified using a wordprocessor. Similar files may be created from most databases such as VIEWSTORE.

In fact, any information to which you frequently refer can be displayed immediately without running another program. Your use of INFORM is only limited by your imagination, as they say!
There are three Inform Data Files (I.D.F.), of often used information, supplied on the disk to give an indication of the use of INFORM.

To use INFORM you must have Sideways RAM.

INFORM on 40/80 track disc. P & P on INFORM £1.00 **£20.00**

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Canon PW1156A (15")	**£414.00**
Citizen 120D	**£190.00**
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Letter Quality Printer	
JUKI 6100 Daisywheel	**£280.00**
BBC Cable	**£ 8.00**

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CABLE to BBC 1.25M, M/C two tone screen dump, Screen text dump, Function key set up program, Function key label printing program, VIEW driver, Character defining program for downloadable character set (draft mode), 100 sheets of paper, Mains plug with 3AMP Fuse, Booklet giving instruction on pack software and general details of using the printer with a BBC.
C.J.E. BBC Printer Packs are £15.00 cassette (£16.00 disc) (e.g. CANON PW1080A with Printer pack £270 + £15 = £285 everything included)

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CJE micro's

BUSINESS

NEWS

Master accounts

Context has released a new version of its *Bank Manager* accounts program. The *Master Bank Manager* supports both the ADFS and sideways RAM, and has further search and reporting facilities it only operates on the Master 128, Compact and B+128 micros and costs £22.50. Contex, 15 Woodlands Close, Cople, Bedford MK44 3UE.

Business book

Small business owners will find help putting their micro to work from a new book: *Using Computers for Business Success*, written by Enid Mumford, a professor at the Manchester Business School, which publishes the book. MBS, Booth Street West, Manchester M15 6PB. Tel: 061-273 8228.

Printer control

A new ROM helps BBC micro users with Epson-compatible printers. R Johnson's *Printer Utility* ROM replaces complex code sequences with star commands such as *ITALICS.

The 16k ROM is £11, and a disc for sideways RAM retails at £7.50. Contact R Johnson, 42 Brackyn Road, Cambridge CB1 3PQ.

Master: no price cut

by Geoff Bains

Acorn is holding firm on Master 512 prices, despite recent IBM PC-compatible reductions. Even though complete PCs, compatible with IBM's, are available for £300, Acorn insists that the £399 Master upgrade and the Master 512 at £900 are 'still good value' and has 'no intention' of cuts. The Master 512's slight incompatibilities with IBM PCs mean that much popular PC software will not run, although this is slowly changing.

Acorn has a loader program to enable the *VP Planner* spreadsheet to operate on the 512 and *dBase III* is now available in an unprotected form, primarily to ease software transfer to hard disc but with the spin-off of allowing it to work on the Master 512.

Acorn claims over 1500 Master 512s have been sold, and 'people still want them'. However, many dealers seem unhappy and prefer to recommend cheaper IBM PC compatibles. Technomatic had sold 50 512s and was disappointed by the machine. A spokesperson from the company said there 'is not enough software'.

Mega-ROM from Computer Concepts

Computer Concepts is to produce a Master 'Mega ROM' of its own. A cartridge containing the entire *Inter* range of software – *InterSheet, InterWord, InterChart* and *InterBase* – will be produced 'just as soon as *InterBase* is finished', said Ian Bishop of Computer Concepts.

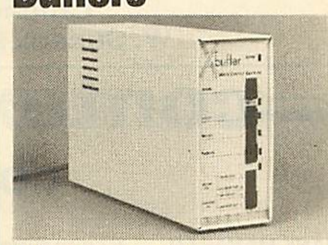
It is unlikely the cartridge will be available before the new year as *InterBase* has 'a long way to go' stated Ian Bishop. It was recently decided to increase the ROM size to 64k to provide more functions.

The 'Mega' cartridge will be produced for the Master 128, and probably the Compact too (sitting on the expansion connector), with a 128k ROM that appears to the micro as just one 16k chip, taking up only one ROM bank.

It will retail at £150, with sizeable discounts for existing *Inter* software owners at 25 per cent off for each package exchanged, up to a maximum of three packages.

Contact Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX. Tel: (0442) 63933.

Buffers



Micro users with extra printers can use switching units to end plugging and unplugging.

Micro Control System's X-Buffer has both serial and parallel inputs, and can connect to serial and parallel printers, plotters or modems. It can also enable two computers to share one output device, or can be used as two buffers. The base costs £129. A 64k, buffer RAM is £30; there are others to 512k at £220. Electron House, Bridge Street, Sandiacre, Nottingham NG10 5BA. Tel: (0602) 391204.

Downsoft's switching unit also has a buffer, and up to three parallel printers can connect to one computer. As for the X-Buffer, route selection is by switches or software codes. The 64k unit costs £199 and the 256k, £229. Downsoft, Depot Road, Epsom, Surrey KT17 4RJ. Tel: (03727) 42696.

BUSINESS TOP FIVE

Title	Publisher	Cassette	Disc	ROM	Electron	B+	Master	6502	Econet
1 ViewSheet	Acornsoft	—	—	£59.50	£29.95	Yes	Yes	Yes	Yes
2 Datagem	Gemini	—	—	£39.95	—	Yes	Yes	—	—
3 Office Master	Gemini	£25	£25	No	*	No	*	*	*
4 Desk Diary	Acornsoft	£6.99	—	—	Yes	—	—	—	—
5 Database	Gemini	£19.95	£23.95	—	—	Yes	Yes	—	—

Compiled by Gallup/MicroScope. Contact publishers: Gemini, Gemini House, Dinan Way, Exmouth EX8 4RS. Acornsoft 645 Newmarket Road, Cambridge CB5 98PD.

Account to five

Gemini's *Integrated Accounting System* has been taken over by Home and Continental Computer Services and is being sold in an updated form as the *Interchange Accounts* suite. HCCS, who wrote the original package three years ago, claims it has outsold all other accounting packages. It comprises five modules, Nominal, Purchase and Sales Ledgers, Stock Control and Payroll.

Improvements include automatic integration of data from one module to another, increased capacity and improved manuals. The improved Interchange modules are available on ROM or disc for £49.95 a time. The ROMs are special format requiring HCCSs ROM box (£20) which plugs into the 1MHz bus.

Further details from HCCS, 28 Hitchin Street, Biggleswade, Beds. Tel: (0767) 318844.

Cross-formatting

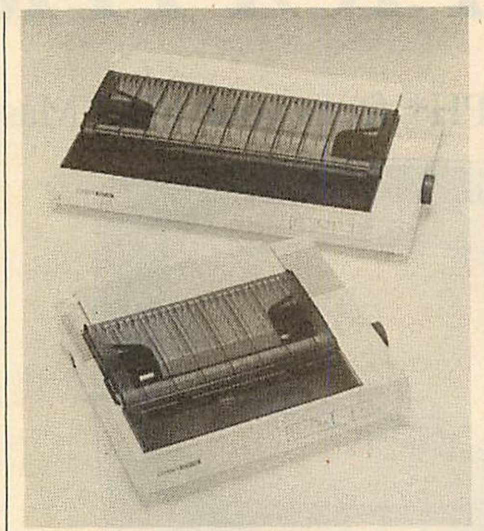
Peartree has produced a utility to copy files from BBC micro discs to other formats.

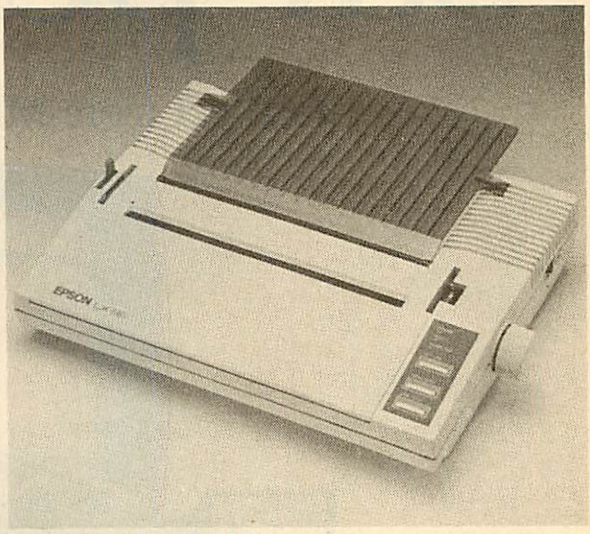
Doscopy is available in three versions. The BBC-MSDOS version (£14.95) copies BBC micro files to IBM PC format and vice versa. *Torch Doscopy* will handle Torch files and *CP/M Doscopy* for CP/M micros; they cost £12.95 each. Contact Peartree, 14 George Street, Huntingdon, PE18 6BD.

Make the switch

Craft Data is offering a range of printer switching units without buffer memory or software selection. A two-way serial unit costs £30 and for parallel printers the price is £35.

Craft Data, 92 Broad Street, Chesham, Bucks.





The MSP 15E (top) and MSP 10E, two of Citizen's new models. Above: the Epson LX-86

New printers galore

The flood of new printers continues unabated.

Epson has replaced the LX-80 NLQ printer with the faster and IBM compatible LX-86. The new model is 20 per cent faster in draft mode, capable of 120 characters per second (cps), and otherwise identical. The LX-86 costs £275.

Citizen has added three models to its range. The MSP10E is a near letter quality (NLQ) printer capable of 160 character per second in draft mode and 40 character per second in near letter quality mode. The MSP10E is fully Epson and IBM compatible and costs £349.

The MSP15E is a wide-carriage version able to take 16in wide paper. It costs £449.

At the top of the range, Citizen's HQP 45 is a wide-carriage machine with a 24-pin printhead. It can print in three modes. In draft mode it manages 200cps, in the higher quality 'memo' mode, 132cps and in 'letter quality' mode, 66cps. The HQP 45 is Diablo compatible and costs £914 including VAT. An add-on card giving Epson compatibility is expected soon.

Canon has replaced its popular PW-1080 NLQ printer with a new model. The A-50 is very similar to the old model but faster (180cps in draft mode and 34cps in NLQ mode) and capable of italic NLQ printing. The A-50 costs £379 and the wide carriage A-55 costs £499.

Texan has updated its KP-810. The only difference in the new KP-810PC+ is the controlling software inside the printer. However, it is now IBM compatible (with 255 characters available without the Epson-type nationality selection), capable of more printing effects and faster. The KP-810PC+ can print in draft mode at 160cps and in NLQ mode at 34cps. It costs £349.

Samleco, a small British printer manufacturer, has released the DX-86. This is capable of 120cps in draft mode and 35cps in NLQ mode. The DX-86 costs £241.

Finally, Pragma's P1013, christened the Personal Line Printer, offers near letter quality printing at twice the quality of standard dot matrix printers, such as Epson's LX-80, and at a faster speed.

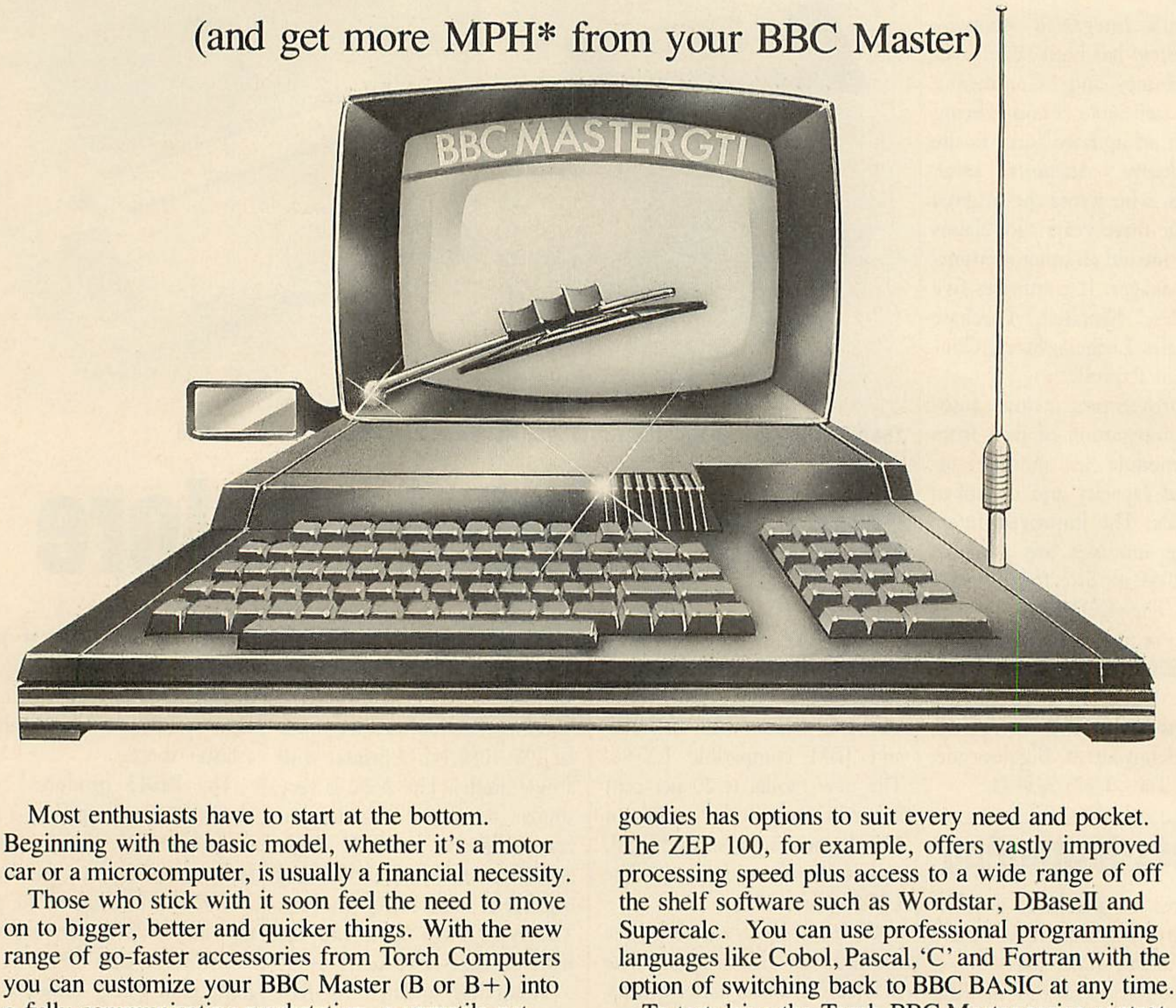
The P1013 produces NLQ characters made up from a matrix of 18×35 dots – nearly twice as many as the Epson LX-80. It is claimed to print text at 134 lines per minute in draft mode and 47 lines per minute in NLQ mode (about 180 and 60 characters per second, respectively) compared to the LX-80's 100cps in draft mode and 16cps in NLQ mode. It can emulate Epson, IBM and Diablo control code standards.

The printer operates in a different way from other dot matrix printers. Its printhead has a horizontal line of 24 pins spaced across the page and prints one complete line of dots at a time.

Two text fonts, Elite and Pica, are held in a plug-in cartridge and further cartridges are expected. The P1013 costs £745 from Pragma, Radlett Road, Colney Street, St. Albans, Herts, AL2 2EP.

How to upgrade your performance

(and get more MPH* from your BBC Master)



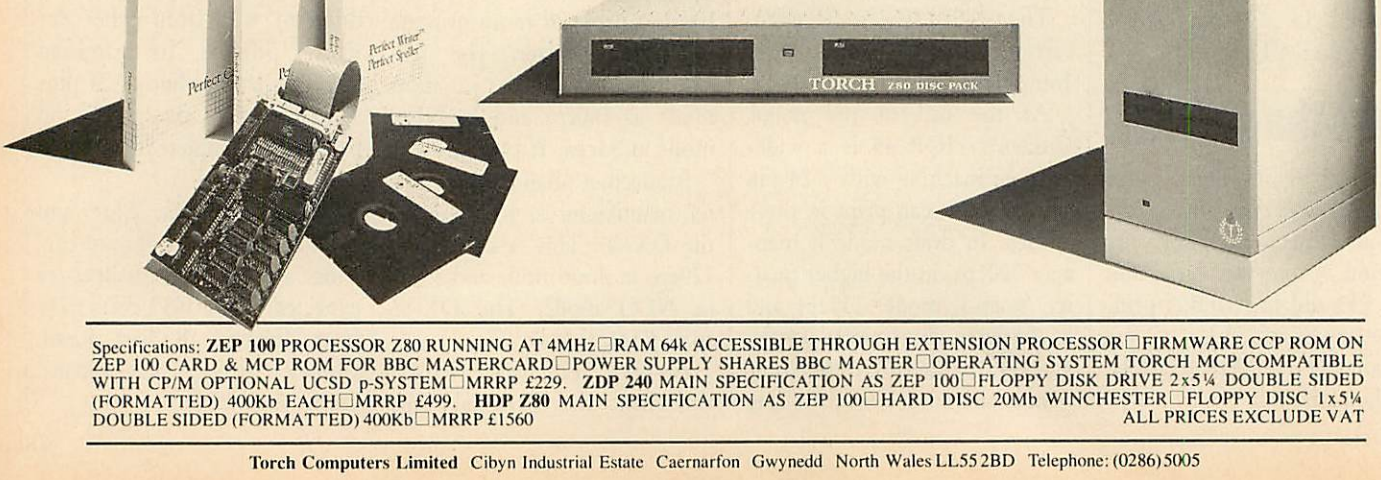
Most enthusiasts have to start at the bottom. Beginning with the basic model, whether it's a motor car or a microcomputer, is usually a financial necessity.

Those who stick with it soon feel the need to move on to bigger, better and quicker things. With the new range of go-faster accessories from Torch Computers you can customize your BBC Master (B or B+) into a fully communicating workstation, a versatile networked system or a complete business machine. Lots more MicroProcessing Hours* for your money!

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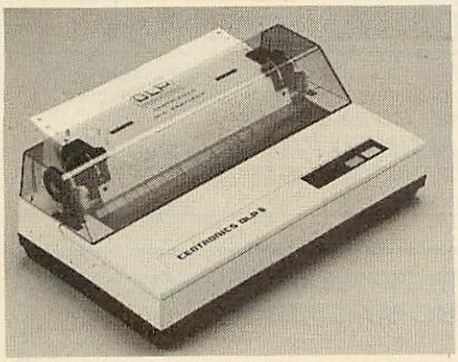
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PUTTING PRINTERS TO THE TEST

In the second of our series on printer reviews, we examine the Centronics GLP II

Martin Phillips

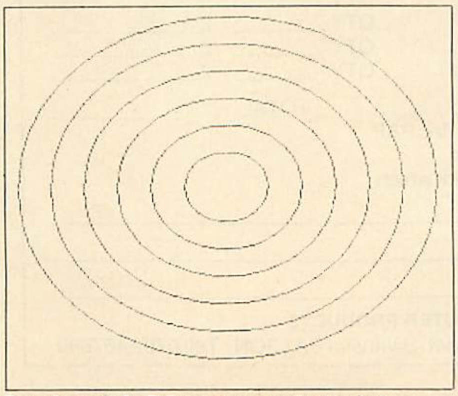
Continuing our series of printer reviews, this month we take a look at the Centronics GLP II. It was put through the same benchmark tests as those reviewed last month. The first benchmark test prints a series of concentric circles, the second prints out all the type styles available and finally the third prints out near letter quality (NLQ) type. Last month's yellow pages carry the program listings to enable you to do these tests.



The Centronics GLP II printer

Centronics GLP II

Target price: £160 (£6 for tractor feed)
Benchmark 1: 1 min 3 sec
Benchmark 2: 5 min 35 sec (partial failure)
Benchmark 3: failed
Features: Epson and IBM compatability. Has both serial and parallel interfaces as standard.
Handbook: The handbook follows the traditional Epson style. Hence it is difficult to follow for the average user, and program listings are given in Microsoft Basic and not BBC Basic. A weakness is the lack of an index or a summary section, making quick reference very difficult indeed.



Benchmark 1. Prints concentric circles

This printer has a very flimsy construction and the plastic case and covers are thin. Sockets are mounted on the circuit board, and this flexes alarmingly when the connecting lead is inserted. The on/off switch is at the front which is useful, and there a power light plus lights to indicate when the printer is plus on line or in NLQ mode. They can only be seen when looking directly over the printer.

On unpacking the printer, the first thing that is necessary is to alter the dip switches to get line feed. There is a very fiddly celluloid cover to be removed, and I spent ages trying to get the two rows of 10 switches set correctly. This was partly because I did not look carefully enough at the handbook where the diagrams do show that the left hand bank of switches is number two and not number one as you would expect, and that the switches are numbered from right to left. As you only set these once, it is a minor niggle. The printer is quiet in operation, similar to the printers so far reviewed.

It also failed two of the three benchmarks. Although it will do italics, on the benchmark coding, the italics font was not produced. Thus it would seem that italics will not work with a variety of other print styles. No mention of this was made in the handbook. The emphasised and expanded text have rather a crude chunky look. A particularly bad point is the small line at the top of 'i' and '1'. This makes the '1' look like a '7'. The NLQ mode was most disappointing. The text was clearly dot matrix, lacking the quality of the Star (see last month's issue), and the only effect that worked in NLQ was the expanded mode. Having said that, I found the NLQ style large and easy to read.

I was disappointed by this printer. It looked and felt cheap and lacked versatility. The print styles are poor and the handbook assumes that the reader has a degree in computer science.

See the November 1986 issue of Acorn User for reviews of the Epson LX80, Star NL-10 and the Citizen 120D. The December 1985 issue gives guidelines for buying a printer.

```
Pica
Pica compressed
Pica emphasised
Pica compressed emphasi
Pica double-strike
Pica compressed double-strike
Pica emphasised double-
Pica compressed emphasi
Pica expand
Pica compressed expa
Pica emphas
Pica compre
Pica double
Pica compressed doub
Pica emphas
Pica compre
  expanded
Pica italics
Pica compressed italics
Pica emphasised italic
Pica compressed emphas
Pica double-strike ita
Pica compressed double-strike italics
Pica emphasised double-
```

Benchmark 2. Different type styles

```
Pica
Pica compressed
Pica emphasised
Pica compressed emphasi
Pica double-strike
Pica compressed double-
Pica emphasised double-
Pica compressed emphasi
Pica expande
Pica compres
Pica emphas
Pica compres
Pica double-
Pica compres
Pica emphas
Pica compres
  expanded
Pica italics
Pica compressed italics
Pica emphasised italics
Pica compressed emphasi
Pica double-strike ital
Pica compressed double-
Pica emphasised double-
Pica compressed emphasi
```

Benchmark 3. Near letter quality type

VIEW IN FOCUS

The Master 128 and Compact User Guides' coverage of *View* is scanty. Here we provide the new user with some guidelines

Clive Williamson

A bonus for anyone buying the Master 128 or the new Master Compact is the inclusion of some of the *View* family of software. Both machines come with the *View* wordprocessor, and the Master 128 has the added attraction of the *ViewSheet* spreadsheet as well. But because the space available to describe the software in the user guides for the two machines was limited, the supplied documentation is rather scanty, to say the least. So new users should find the following collection of hints about *View* helpful.



View **is a useful wordprocessing package but not explained well in user guides**

Creating a 'Start' file

View's default page settings allow four lines either side of the 'header' line at the top of the page, and a similar configuration round the 'footer' line at the bottom of the page. This may be suitable for some applications, but the total of 18 lines is often too many to leave blank on a page. Thus it's a good idea to design your own page layout using the Top Margin (TM), Header Margin (HM), Left Margin (LM), Footer Margin (FM) and Bottom Margin (BM) stored commands, and save this as a file on its own under the name 'Start'. Thus there is no need to type in all the commands each time you begin a new text file – you simply load in the Start file and off you go! The final result may be similar to figure 1.

It is useful to include your usual text ruler in the Start file, whether it be the default mode 3 ruler, for example, or one you have designed yourself; you can then be sure that your results will be absolutely consistent. The example shown in figure 1 sets the page length to 70 for A4 paper (*View*'s default setting is 66 lines to a page, suitable for 11in paper). A line is included to define the header (DH) using a left, centre and right component, separated by slashes. The last but one line sets the page numbering register to one, while the Define Footer (DF) line prints the page number at the foot of each page.

If you are saving your files on disc, you will find that the Screen, Print and Sheets commands used to preview and print the text will work when several different file-

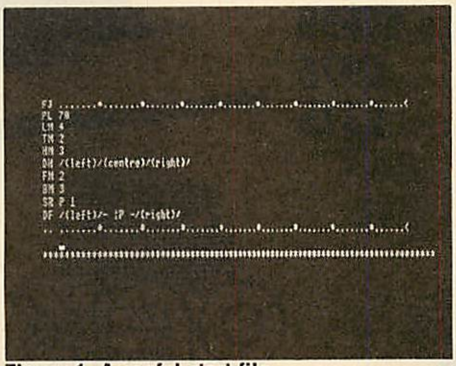


Figure 1. A useful start file

names are entered consecutively after the relevant command. Up to 33 are allowed – as long as each file name is only one character long, since the names must all fit on one line of the screen display. The following example would print FILE 1, FILE 2 and FILE3 one after the other:

PRINT FILE 1 FILE 2 FILE 3 Return

Any page numbering, headers, footers and other formatting details specified in the first of the files will be maintained throughout, unless you alter them in a subsequent file.

The text will be printed without a break from one file to the next unless you deliberately include page eject (PE) commands at the end of each file. The only precautions you must take are to ensure that the use of rulers is compatible through all the files to be printed, and to put a Page Eject commmand at the end of each file if you wish the next to begin at the start of a new page.

This technique can be extremely useful if you need to make a document up from standard sections, or if your files are broken up into sections as a result of memory constraints.

Printing several identical copies

You may wish to print several copies of the same document, and although *View* does not specifically ask how many copies you require at the print out stage, it is possible to make multiple copies nevertheless.

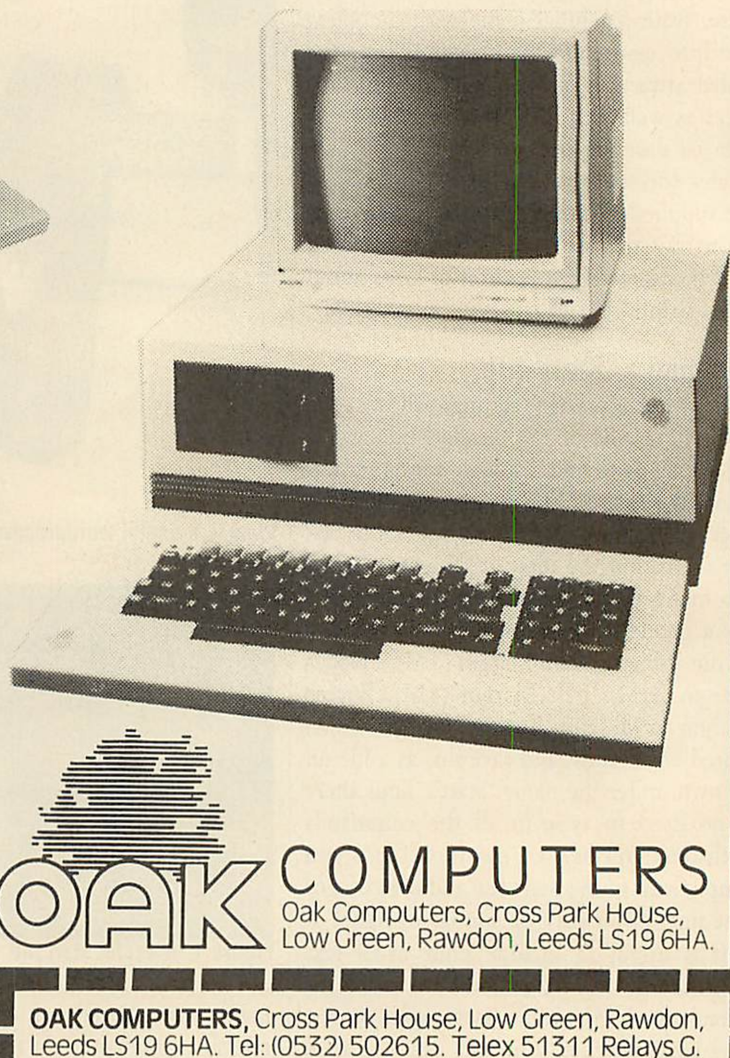
You simply specify the same name over and over again when entering a list of files to be printed using PRINT or SHEETS, and *View* will reprint the same file each time. Thus if you give the file a single character name you can print up to 33 copies in one go, this is the maximum number of separate characters that can follow the abbreviated printing commands on one line.

If you are not using footers in your document, you will probably have to in-

THE OAK PROFESSIONAL COMPUTER MASTER RANGE



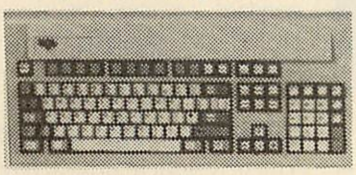
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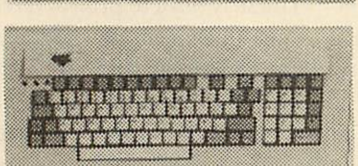


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clude a Page Eject (PE) command at the end of the text, to ensure that each copy begins on a new page. A useful precaution if you are using automatic page numbering is to include a command to reset the numbering to one (or the required start number) at the start of each file. For example:

SR P 1

If you fail to do this, the page numbering becomes cumulative when printing.

Wrong format on the first page?

Sometimes when you are using headers and/or footers in your text, you can find that the first page looks all wrong. This is usually because you have left a blank line or some text at the top of your file, before the header and footer details. This can result in a first page without the expected formatting, or a complete blank page for no apparent reason. To cure the problem, delete any blank lines above the header and footer definitions, which should be right at the top of the file, and move any spurious text below your stored commands.

Which disc filing system?

Disc drives on the Master 128 can be run with either the standard disc filing system (DFS), or the newer advanced disc filing system (ADFS). The Master Compact comes with the ADFS only, although a DFS chip can be installed if required. The DFS and ADFS are fundamentally different in the way they store data on the discs, and so they are not directly compatible. The double-density ADFS discs are capable of storing a virtually unlimited number of files in a 'hierarchical' directory structure, rather than the 31 files per drive supported by the single-density DFS.

The structure of data storage under the ADFS is known as a hierarchical one because the system begins with one major 'root' directory (the '$' directory), and this can contain up to 47 files or directories, and each of the directories can contain 47 more files or directories, and so on. The theoretical picture of all this is rather like the branches of a tree, and the complete path to your file through each directory must be quoted, so that the ADFS can find the right program.

Despite being a little more complex in use, the ADFS is far more versatile than the DFS, and much better suited to storing large numbers of short files such as letters or invoices. It is also recommended for working with the *ViewStore* database, so new users would be well advised to get used to the ADFS as soon as possible. Especially as the ability to use up to 10 characters to name the files in the ADFS certainly helps to identify the file's contents more clearly than the seven allowed by the DFS.

When working with *View* or *ViewSheet*, it is sensible to have a main directory (eg, 'Viewfiles') to store your work in, then use the *DIR command to give you fast access to it, ie:

*DIR VIEWFILES

will set the current directory. Then you can use the Name command in *View* or *ViewSheet* to name the file you are working on. To save the data you simply enter SAVE, or even the SA abbreviation, each time. All this gets round the need to enter the full specification for the file each time, which would be:

$.VIEWFILES.filename

in this case. Make sure you don't end up with too many sub-directories giving long routes through to frequently-used files, as this can be very time-consuming. A little thought about disc storage can save you a lot of waiting.

Speeding up your work

A number of short cuts are made possible by the nature of the wordprocessor software and the computer itself. For examaple, *View* contains commands to help you look for specific words or phrases, or markers set within the text.

It also allows abbreviations for some of the commands (eg, PRINT becomes P; LOAD is L) and, as you have already seen, the version of *View* in the Master machines lets you pre-define the name of the file you are working on, so there is no need to keep typing it in each time you save the text.

It is particularly easy to save paragraphs or large sections of text that you need to use time and time again, and read them into a new file whenever they are required. The BBC micro itself contains commands that can speed up the cursor movement as you gain confidence, and you can also make use of the red function keys to store often-used commands or phrases.

Command abbreviations

To improve your general efficiency when using *View*, you may like to learn some or all of the abbreviations for the various commands used in the Command mode. These commands and their associated abbreviations are illustrated in table 1.

Unlike abbreviations for disc commands in the BBC micro, there is no need to follow the shortened version of a *View* command with a full stop. If you should do so, *View* may interpret the punctuation as the character used to separate the command from a filename (this is known as a delimiter) and thus produce error messages to the effect that it does not recognise the name of the file.

Command	Abbreviation VIEW 1.4	VIEW 2.1	VIEW 3*
LOAD	—	L	L
SAVE	—	—	SA
SCREEN	—	—	SC
PRINT	P	P	P
SHEETS	—	—	SH
FORMAT	—	—	FOR
MODE	—	—	M
NEW	—	—	—
OLD	—	—	—
READ	—	—	RE
WRITE	—	—	W
EDIT	—	—	E
MORE	M	M	M
FINISH	F	F	F
QUIT	—	—	—
PRINTER	—	—	PRINTE
MICROSPACE	—	—	MI
COUNT	—	—	CO
CLEAR	—	—	CL
SEARCH	S	S	S
CHANGE	C	C	C
REPLACE	R	R	R
FOLD	N/A	—	FO
WILD	—	—	—
FIELD	—	—	FI
NAME	N/A	N/A	N
SETUP	N/A	N/A	SE

As fitted to the Master Series 128 and Master Compact

Table 1. Valid abbreviations in *View*

Speeding up the cursor

As you become more familiar with *View*, and for that matter any of the other programs in the *View* family, you will probably find the standard speed at which the cursor moves around the screen a little on the slow side. This can be easily rectified using *FX commands:

*FX 11

governs the length of time before a key auto-repeats if it is held down:

*FX 12

controls the amount of time between each auto-repeat. The default settings for these times are 32 and eight-hundredths of a second respectively. It is unwise to reduce them too much or the slightest pressure on

a key will enter lots of characters, or send the cursor whizzing all over the document. They can comfortably be adjusted to 25 and six-hundredths for a much more responsive feel. The new parameters for the FX commands can be entered at any time from the Command screen:

*FX 11,25 Return

*FX 12,6 Return

Once you have speeded up the cursor movement, it is unwise to keep your finger pressed on the keys when doing things like moving up through the text a screenful at a time or deleting lines. The relative speed with which the micro responds to the key presses may cause you to overshoot, and accidentally destroy more text than you intended. If you wish to reset both the delay and auto-repeat times to normal, you should enter:

*FX 12,0 Return

Saving and loading text portions

By enclosing a section of your text in markers it is possible to save and load only the marked section on to disc or cassette using the WRITE command.

Suppose you have a set paragraph that you often use to begin or end a letter. Once it is written on the wordprocessor, you can save it for use time and time again as a sort of building block.

This is done by placing it within two markers (markers one and two are best, as they show up on the screen), and making a new file of the marked section only. Position the cursor at the start of the chosen paragraph, and press the Set Marker function key (Shift-f7) You will be prompted in the top left corner of the screen for the number of the marker to be set. Press '1' and you will see the marker appear as an inverse character. Then move the cursor to the end of the paragraph – the blank line after it is a good place to choose – and set marker two in the same way.

If you now go to the Command screen, you will see that an extra line has appeared at the bottom of the status display which says Marker(s) set 1,2. Now put a disc in the drive to take the marked section, and decide on a filename for it. If the file is to be called PARA1 then to save it onto the disc and enter:

WRITE PARA1 1 2

The numbers at the end specify the markers between which the area to be saved lies. If they are omitted, then *View* will WRITE the whole of the file in memory to the PARA1 file, rather than just the marked section. So WRITE is roughly the equivalent to the SAVE command, except that it can be used with markers, whereas SAVE cannot. If you are using the disc filing system you may notice that WRITE is considerably slower than SAVE. This is seen even more clearly with the Econet network.

The corresponding equivalent of the LOAD command is READ, which enables you to retrieve files and add them to existing text in memory (unlike LOAD, which erases anything previously held in memory). READ used on its own (eg, READ PARA1) will place the specified file at the end of the text in memory. You may want to put it elsewhere, in which case you can set a marker at the point where you want the contents of the file to be inserted, and quote the marker number at the end of the READ command:

READ PARA1 1

In this way you can assemble new work from often-used passages of text (changing them afterwards if required), or you can re-use complicated tables that you have already created, and generally save a lot of time. The READ command can also be used to incorporate text-only files from other programs (such as *ViewSheet* and *ViewStore*) in the preparation of reports, and from electronic mail.

Using the function keys

In addition to performing the range of operations shown on the function key strip in *View*'s Text mode, the BBC micro's red function keys can be assigned extra duties which can significantly speed up your use of the *View* software.

Each key can be used in two different ways. In Text mode they can be loaded with often used words and phrases, which can save a lot of time when you are typing, and from the Command screen the keys can generate complex or often-used sequences of commands.

The BBC micro can be given new 'definitions' for the contents of each function key using the *KEY operating system command. Running a language like Basic, for example, once a key has been defined it can be used straight away to generate the necessary command or characters stored in it. In the case of the *View* family, an extra command must be given to the micro first, in order to 'free' the contents of the keys. The defining of the keys is all done from the Command screen. You need to enter:

*FX 228,1

Then, to define a function key, you use the *KEY command, followed by the number of the key in question, and what you want it to do. Say you wanted a function key to hold a long word that you needed to use a lot throughout an article, such as 'staphylococcal'. To load the f0 key with this, you should enter:

*KEY0 "staphylococcal" Return

The double quotes are not absolutely necessary, but they do make it clear to the micro that this is a phrase of text to be dealt with, and not a command. If you then go into text mode, you can make the key print out its contents onto the screen by holding down both the CTRL and Shift keys at once, then pressing f0. You will see the word or phrase appear on the screen as if it had been typed in.

The second way of using the function keys is in the Command mode itself, where they can be used to hold command sequences. Say you want a single keypress to lock all the files on your disc so they can't accidentally be deleted or overwritten. If you are using the disc filing system, this can be done using the command *ACCESS. To make key f1 lock all the files in every directory, enter:

*KEY1 "*ACCESS *.* L¦M" Return

¦M is a way of making the key enter a Return after issuing the instruction (¦ is the symbol on the key at the top right of the keyboard). In mode 7, this appears on screen as ¦¦. To make use of this key in the Command mode, there is no need to hold down the CTRL and Shift keys. As long as you have already entered:

*FX228,1

Simply pressing the function key on its own will generate the necessary characters, and the current disc drive will whirr into life, locking all the files on that drive. To unlock all the files, another key could be loaded with:

*KEY2 "*ACCESS *.*¦M" Return

which will unlock every file in every directory. Note that the ADFS does not allow you to lock every file in every directory, but you can make key 1 lock all the files in the current directory using:

*KEY1 "*ACCESS * L¦M"

and similarly *KEY2 can unlock the files again if you enter:

*KEY2 "*ACCESS *¦M"

Rather than type these function key instructions in each time you use the machine, it would be useful if they could be held in a file to be read in automatically when you begin work. You can edit a *View* file like the one shown below, then make up a text only version (called Keys,

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perhaps) which can be read in at any time by typing:

*EXEC KEYS Return

whereupon the micro will read in the set of definitions just as if they had been typed at the keyboard (see figure 2).

When in a graphics mode, pressing f8 gives white text on a blue background, while f9 gives green text on a black background

Once the text has been entered, you need to create a file which can be read into

```
*KEY 0 "*DRIVE 0|M"
*KEY 1 "*DRIVE 1|M"
*KEY 2 "*DRIVE 2|M"
*KEY 3 "*DRIVE 3|M"
*KEY 4 "*ACCESS *.* L|M"
*KEY 5 "*ACCESS *.* |M"
*KEY 6 "*CAT|M"
*KEY 7 "COUNT 1 2|M"
*KEY 8 "|S|A|G|@|@|@|M|S|@|D|@|@|@|M"
*KEY 9 "|S|A|B|@|@|@|M|S|@|@|@|@|@|M"
```

Figure 2. Function keys defined

the Command screen from disc without any adverse effects. *View* files are not pure text – they contain special characters called control codes – which can upset the micro if you try to display them on the screen, rather than trying to LOAD the file into *View* first. So you need to make a file of text characters only. This is known as an ASCII file (standing for American Standard Code for Information Interchange), and to generate a text-only file you need to screen the file and make a copy on disc as you do so. First, press Escape to get to the Command screen, then place a suitable disc in the disc drive. Make sure that you have saved a copy of the above *View* file first, in case anything should go wrong. Then enter:

*SPOOL KEYS Return

The disc will rotate, then stop. The micro has opened a file called Keys on the disc, and will now feed anything that appears on the screen straight to it. Now screen the file with the function key definitions, either from disc or from memory. Once this is done, type:

*SPOOL Return

to close the Keys file. Then type NEW and load the Keys file into *View* using the READ command as follows:

READ KEYS Return

READ is used instead of the normal load command, because it is suitable for bringing text into *View* that is not in the regular *View* file format. If you now press Escape to go into Text mode, you will see that the file has been read in, and you can go through it deleting any unwanted lines using the f7 function key until you are left with the required block of text. Do not make any other alterations at this stage, but use the Save command to re-save Keys in

```
*FX 228,1
*FX 202,48
*WORD
MODE 3
SETUP FI
NEW
PRINTER JUKI4
*KEY 0 "*DRIVE 0|M"
*KEY 1 "*DRIVE 1|M"
*KEY 2 "*DRIVE 2|M"
*KEY 3 "*DRIVE 3|M"
*KEY 4 "*ACCESS *.* L|M"
*KEY 5 "*ACCESS *.* |M"
*KEY 6 "*CAT|M"
*KEY 7 "COUNT 1 2|M"
*KEY 8 "|S|A|G|@|@|@|M|S|@|D|@|@|@|M"
*KEY 9 "|S|A|B|@|@|@|M|S|@|@|@|@|@|M"
```

Figure 3. A complete auto–boot sequence

this final form. You will now be able to load all the key definitions into the micro by entering, *EXEC KEYS Return from the Command screen. Using a similar file, a complete 'auto-boot' sequence could be edited together for the BBC micro as shown in figure 3. This can save a lot of time as it can be used at the start of each session to set the micro up

*FX 202,48

Turns off the Caps Lock, while:

SETUP FI

Sets *View*'s formatting and insert modes on, and justification off.

You can include the instruction to load in a printer driver as well, as long as a copy of the driver is on the same disc. The above file should be prepared as a text only file using the method described above, and finally saved under the name $.!BOOT. All that is needed then is to set an auto-start option on the disc by entering:

*OPT 4,3 Return

This will enable the BBC micro to read in the contents of any file on drive 0 called !BOOT, as if they had been typed in directly at the keyboard. To 'boot the system' in this way, you simply press the Shift and Break keys simultaneously and then, release the Break key first.

Clive Williamson is the author of Mastering View, ViewSheet and ViewStore, *published by Sigma Press, November 1986, £12.95.*

The screen

In applications where prolonged use of *View* or *ViewSheet* is anticipated, the slightly blurred image obtained on a domestic television can be extremely tiring to watch. A sharp picture is particularly important when using the 80-characer per line display, and the solution could be to obtain a high-definition colour monitor. This could handle the fine detail created by the BBC micro, making it equally suited to games, educational and business use. Purely business users will probably select a very sharp monochrome monitor with a green or orange screen. In all, the Master 128 is equipped with three different sorts of outputs for driving visual displays, and is hence capable of feeding a wide variety of televisions and monitors.

Working in colour

You can readily obtain different coloured text using *View* (and the other *View* family software) so if you are using a colour monitor, you may prefer to change the normal display from white text on black to something a little less hard on the eye. Good combinations are green, yellow or pale blue on black, or white on dark blue. If you are using a low resolution colour monitor in an 80 column mode, it is often best to go for the green text colour, as this is easy to read, and only uses one colour gun in the monitor's tube, so it can often give sharper results as there are no registration problems.

To change the screen colour from within *View* or *ViewSheet*, you need to go into your selected graphics mode, then enter a series of characters in the Command mode – for green text, you should hold down the CTRL key, then press the following key sequence:

S A B @ @ @

The text colour will change to green as soon as you press the last '@' character, and you can then let go of the CTRL key. This is the equivalent of using a VDU 19 command.

The sequences for other useful colours are as folllows:

For yellow:

S A C @ @ @

For cyan (pale blue):

S A F @ @ @

and to restore the normal white text:

S A G @ @ @

To keep the foreground white, but change the background colour to dark blue, enter:

S @ D @ @ @

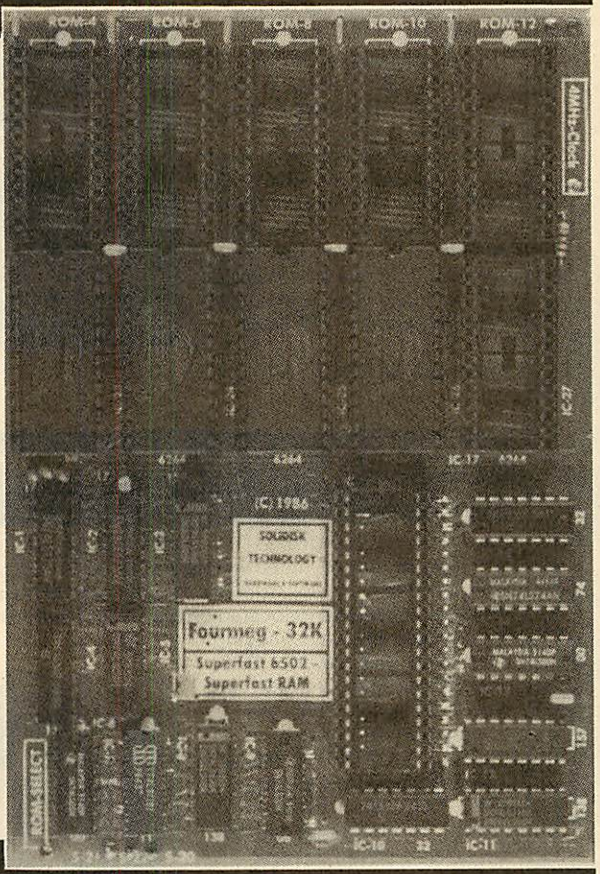
again, keeping the CTRL key pressed the whole time. To restore the black background, use:

S @ @ @ @ @

Hints for working is colour and getting the best from the screen.

SOLIDISK NEW DEVELOPMENTS

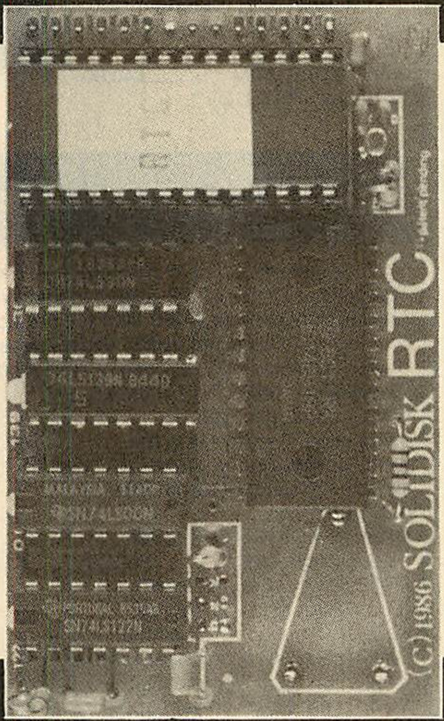
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The TWOMEG-32K combined the usual functions of a Sideways ROM board — offering storage for up to 160K on board and 64K on the Beeb itself (a total 224K out of 256K possible) and a SHADOW RAM compatible with major 'language ROMs' such as BASIC, VIEW, WORDWISE, INTERWORD, VIEW-SHEET, VIEW-STORE etc.
When Shadow RAM is in use, a small 8K of Sideways RAM is available for loading ROM images or a small printer buffer. When SHADOW RAM is not in use, the entire 32K additional RAM can be used as TWO banks of SIDEWAYS RAM or as a RAM DISC (available only with Solidisk DFS or ADFS).
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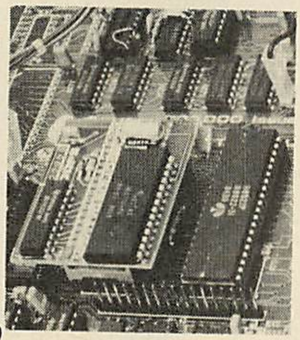
In Brief:

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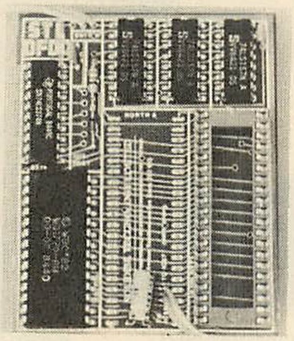
SOLIDISK BUDGET DISC SYSTEMS

Double density disc interface



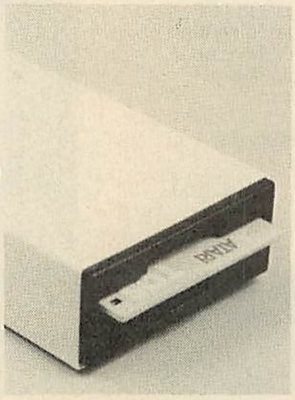
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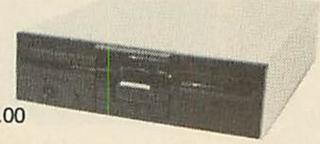
The finest product yet for any BBC computer fitted with the 1770 Floppy Disc Controller (Model B, Plus and Master 128K and Electron) encompassing many Master 128K specifications. The list of features is so extensive that it would require a lot more space to describe it. In brief, it has ALL the features of the 2.2 DFS ROM except device drivers for the INTEL-8271 chip, full ADFS implementation comparable to the MASTER 128K. Plus ADFS-FORMAT (FORM40, FORM80 and FORM160) and VERIFY. Plus MVDFS and MVADFS to transfer files between DFS and ADFS formats with automatic PAUSE for disc change rendering possible to operate with a single drive. Low PAGE value. Compatible with 6502, Z80, 32016, 80186 (Master version) Second Processor. Two manuals.
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Please mention computer model when ordering. Order as ROMS2.1S. Also available on a single 32K EPROM as ROM2.1/32.

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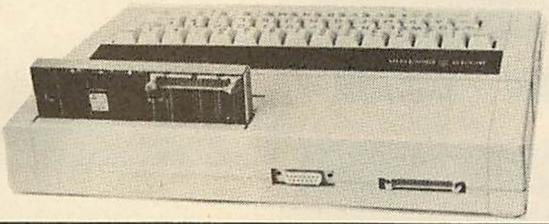
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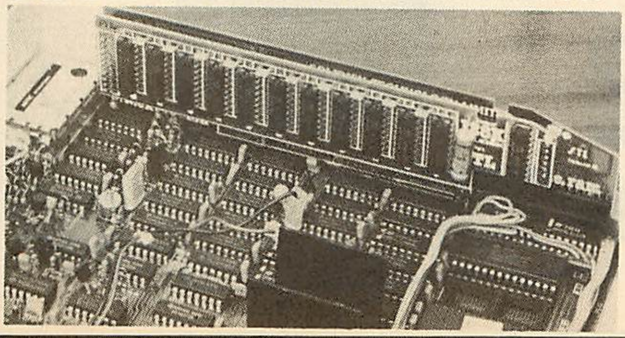
Electron Disc Interface:

This unit (EFS) plugs into the PLUS-1 Expansion and allows connection of a twin disc drive system and a Winchester. The Disc Interface is based on the same WD1770 chip as used on the Beeb. The Electron Disc Filing System software in ROM (32K) is a version of the Solidisk ADFS 2.1 thus offers a large degree of compatibility with Beeb software. The system is capable of both Beeb DFS format (single and double density) and ADFS format as used on the Acorn PLUS-3. The unit also has a 16K of Sideways RAM which can be used to load ROM images. The unit is guaranteed for one full year but we warn the users that the built-in Sideways RAM is UNRELIABLE hence the reduced price of only: .... £50.00.
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Old Style SWR32 and 128K:

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The SWR32 system consists of a BASE UNIT which plugs into the rightmost ROM socket on the BBC board and a (exchangeable) RAM CARD. The RAM CARD also has extension socket for a piggy-back memory board capable of bringing the extra memory to 128K bytes of RAM.
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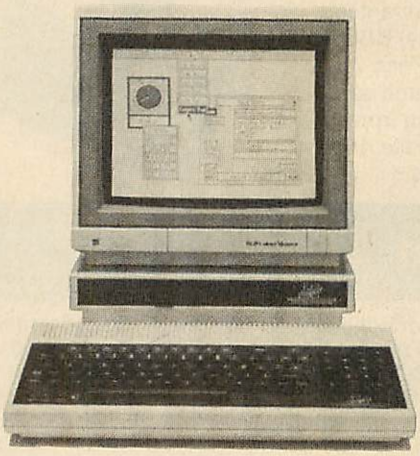
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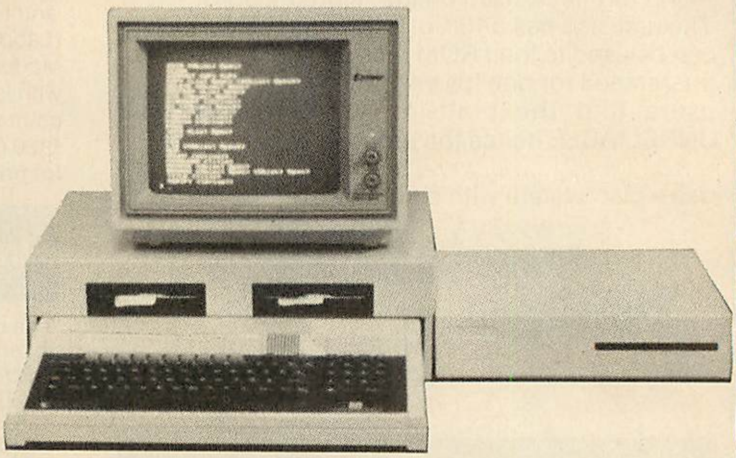
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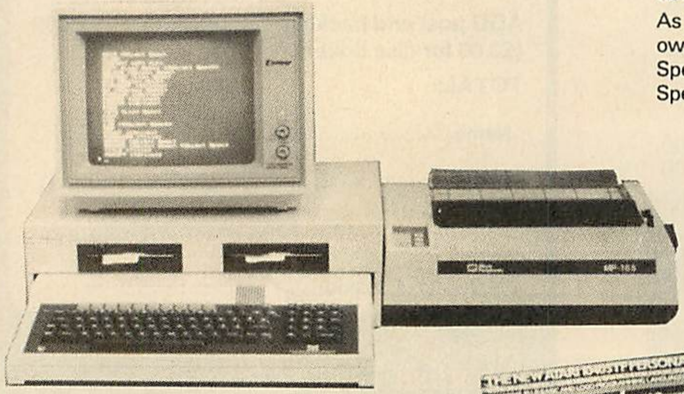


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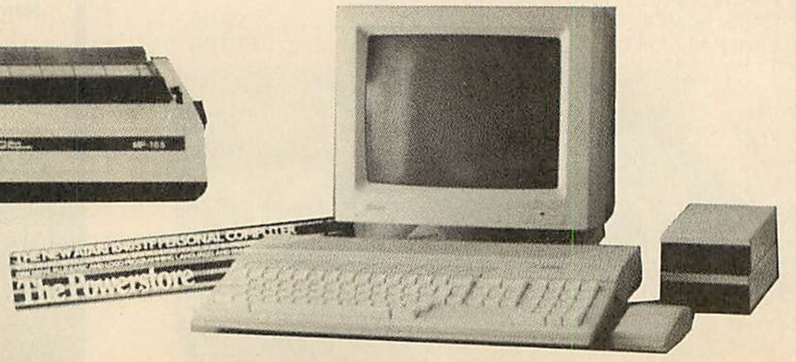
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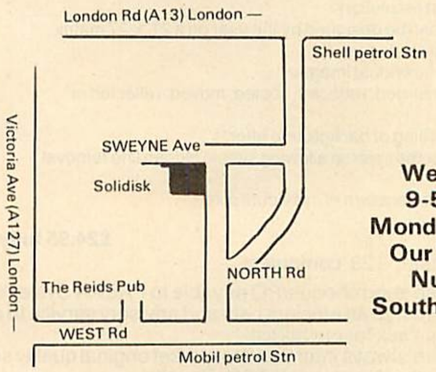
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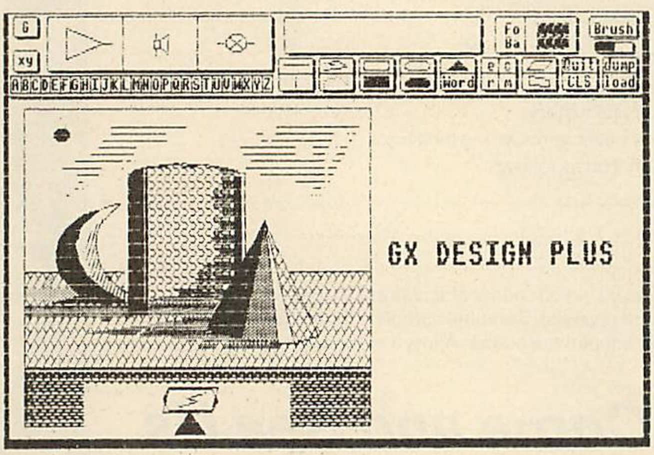
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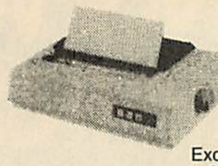
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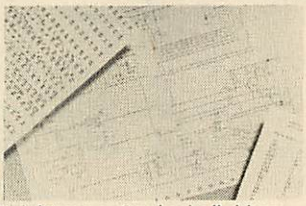
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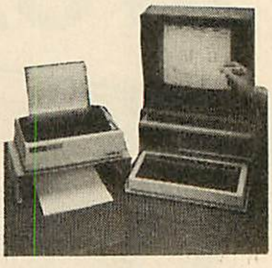
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EDUCATION

NEWS

Hints for new users

● The Compact's price means that, as an Econet station, the full colour version is considerably cheaper than using a Master Econet station at £399 without disc drive or monitor.

● Education authority computing centres are going to be doing big business in converting between the two disc filing systems and the two sizes of disc – try Advanced Computer Products' Advanced Disc Toolkit which will take all the sweat out of the operation.

● If your programs do something illegal, beware – there is a new Basic in the Compact.

● You may find that Blu-tak comes in handy when using function key strips.

● Watch out for peculiarites of the ADFS in operation. The computer stores the disc catalogue and other information in RAM. Change the disc and then catalogue it and the same catalogue as before comes up. You must use MOUNT.

● If you need to back up 3.5in discs and have no double drive then prepare for hard work. If you are good at it it will take you about 10 minutes. Remember a 'large' formatted disc contains about 640k.

● Although the Compact takes up less space than a BBC B or Master, you will need to keep the keyboard well away from the disc drive-cum-monitor stand – if you want to get your discs in the drive, that is!

Advanced Computer Products, 6 Ava House, High St, Chobham Surrey, GU24 8LZ. Tel: (0276) 76545.

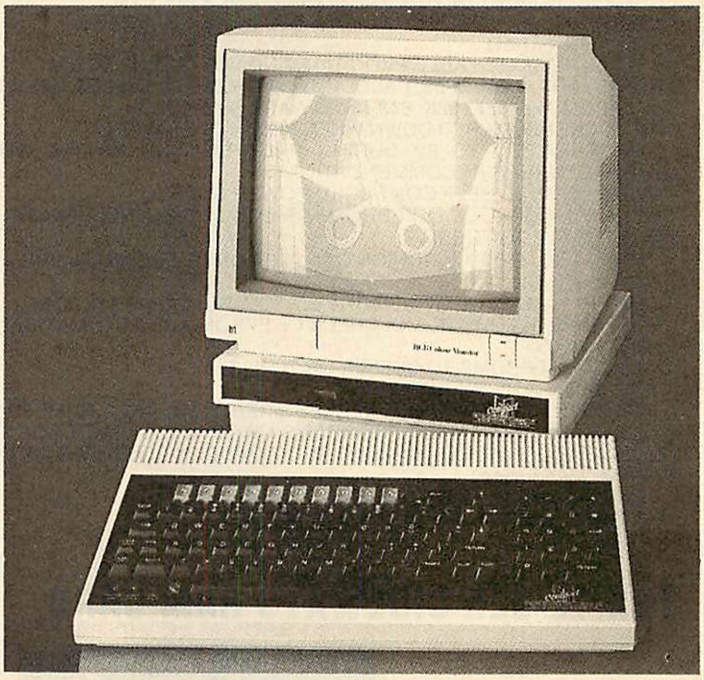
Compact impressions

Acorn's latest offering, the Master Compact, has been with us now for a couple of months and first-time users are able to give some impression of the impact of the various new directions started in this machine. One factor that distinguishes the Master series is the wide base of education software already available.

Acorn, unlike other manufacturers, has specifically cultivated software houses from all shades of computer use for the Master and the Compact. Machines that come with a ready made software base have much more credibility than others built on promises.

Nonetheless, there has been criticism of the pruning of interfaces and ports for communicating with the outside world. The problem is that those ports are the main cause for the expense of the computer – remove them and the price plummets. If you select which ports you are going to remove you will always displease someone, however. Probably the most noticeable omission for educational users is the User Port. Concept keyboards, mice, plotters, control equipment and a whole range of other devices are reliant on the existence of that port on both BBC B and Master micros. On the Compact we have an edge connector of mysterious character and an Atari-style joystick port which no BBC micro joysticks fit!

Why? Acorn are not stupid – despite the very good act they sometimes manage to put on.



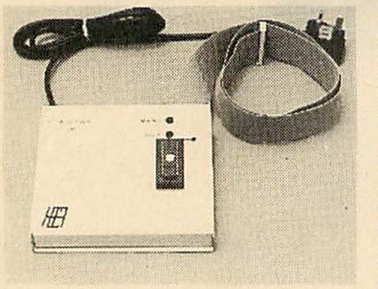
The old joystick port – the analogue port for the technically minded – is an expensive interface and notoriously inaccurate. The new-style port is not analogue but digital and hence there is an improvement in accuracy.

Why no User Port? The digital joystick port will perform many of the functions that the User Port did. Many, but not all. Mice can happily be adapted to run off that port – as can the Concept keyboard. Their software will need to be modified because different lines in and out are being addressed. Control applications will not have much joy here without a major re-think. People have become so used to hanging a variety of devices onto the User Port that the connections needed are ingrained into their memories. The combination of the edge connector and the joystick port can be made to emulate the User Port exactly – something done by Resource with their Compact User Port add-on, which replicates all functions of the User Port.

The edge connector on the Compact provides the perfect facility for enterprising companies to create a cartridge system. Second drives are standard from Acorn but there will be Winchesters, the Viglen DUCC to dual up 5.25in drives with the 3.5in, second processors, and so on. In effect, it is unlikely that there are many Master facilities that will not soon be available in some form for the Compact.

Contact Resource, Exeter Road, Doncaster DN2 4PY. Tel: (0302) 63800.

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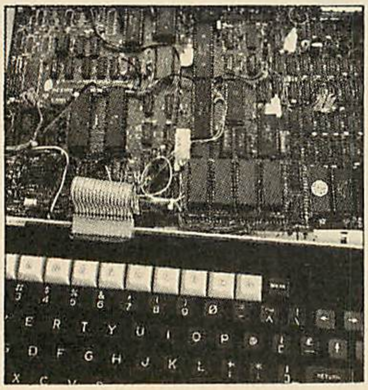
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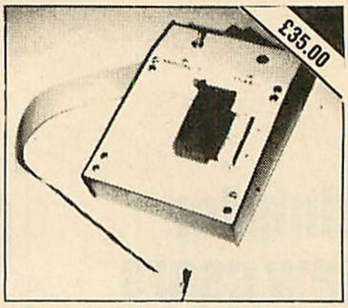
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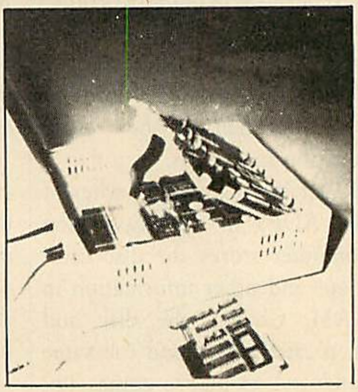
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HCR ELECTRONIC SERVICES

Getting behind the Times

Users of The Times Network for Schools (TTNS) are often frustrated by the expense of training children to use the system. This problem has been noticed and acted on by two organisations – LTS and Countesthorpe College.

LTS has produced a package called *Macemail* which enables network users to treat their network as if it were individual computers communicating via a Telecom Gold-style system. The package was developed by Mace under the Microelectronics Education Programme but has since been taken over by LTS for publication. The documentation is exceptionally clear and the user is guided step by step in integrating the package into the Econet system. Versions are available such as mailing express, sending to all users and filing messages. There are extensive teacher's notes which explain ways in which the package can be integrated into the curriculum.

The second program, *Mailbox*, was developed by Simon Goodall, Head of Computer Studies at Countesthorpe College. This package will also run on more than one network, 'with a little imagination', and some of Simon's ideas for use of the network stand repetition: 'The group were studying the use of computers by the police. I set up a database of about 50 records each containing fictitious information about a criminal.

The group were given a scenario about a gang of bank robbers... each group had clues which pointed to members of the gang but not so they could be identified directly from that clue. Each small group then had to convey their information to the other groups (police forces) using the mailbox program.'

Macemail, LTS, Haydon House, Alcester Road, Studley, Warwickshire. *Mailbox*, Countesthorpe College, Leicester.

Get your pictures digitised

Parkside Developments are offering a digitising service aimed primarily at owners of AMX *Pagemaker*. Monochrome photographs or line drawings up to 12in by 10in can be accommodated. An 80-track disc will hold up to nine pictures and a 40-track disc, four pictures.

The service is offered at £1.50 per picture plus £2.80 to cover the cost of the disc, postage and packing. Details from Parkside Developments, 9 Ingleby Gardens, Chigwell, Essex IG7 6EH. Tel: 01-500 5701.



Digitised heroes from Parkside

EDUCATION TOP FIVE

	Title	Publisher	Cassette	Disc	ROM	Machines*	Econet
1	Number Chaser	Acornsoft	£6.99	£11.50	—	B/B+/E	No
2	Words Words Words	Acornsoft	£6.99	£11.50	—	B/B+/E	No
3	Best 4 Language	ASK	£19.95	£19.95	—	B/B+/E/M	No
4	Best 4 Maths	ASK	£19.95	£19.95	—	B/B+/E/M	No
5	View	Acornsoft	—	—	£59.80	B/B+/E/M	Yes

Compiled by Gallup/Microscope. Publishers: Acornsoft, 645 Newmarket Road, Cambridge CB5 8PD. Tel: (0223) 214411. ASK, London House, 68 Upper Richmond Road, London SW15. Tel: 01-874 6046. *Machines include the following: B(BBC); B+(BBC B Plus); M(Master); E)Electron).

Penny's plan for Logo

If you want to know about Logo it would be worth buying the useful volume by Ros Penny entitled *A Guide to Logo*. This excellent little book is one of a series of 12 published by the Computer Education Centre at Liverpool Polytechnic.

It is intended to give teachers some idea of what Logo is, explain the jargon, compare the features of 10 commonly available Logo packages and indicate the types of primitives teachers should look for if they want a Logo suitable for specific purposes such as control or animated graphics.

The book is pleasantly presented and does not patronise the newcomer. It is based on Ms Penny's experience and her desire to see Logo as a more universally adopted programming language. Indeed the lack of a coherent policy on Logo has prompted her to put forward proposals for a National Logo Centre. She sees the language as having applications in both primary and secondary schools especially in problem-solving and communication applications. Logo can improve mathematical ability, says Ms Penny, and develops a general awareness of the impact of IT. She argues for a plan for teacher training, liaison with developers, users and publishers, specific curriculum development projects and centralised reference collection of Logo implementations, software and publications.

Contact Ros Penny, Millbrook College of FE, Liverpool L11. *A Guide to Logo* may be obtained from the Computer Education Centre, Liverpool, Polytechnic, 70 Mount Pleasant, Liverpool L3 5UX.

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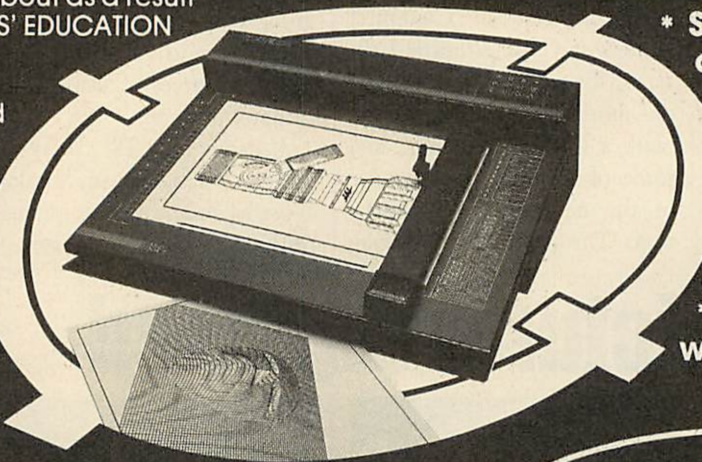
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STOCKING FILLERS

Advise for parents on choosing software and hardware for their children this Christmas

Chris Drage and Nick Evans

In the education section of the October 1986 issue of *Acorn User*, we looked at some of the issues arising from choosing educational materials for home use. In that article an overview was made of the various types of software that may be appropriate for your child's needs and the conclusion was reached that probably the most valuable approach you as a parent can take is to help the child develop skills. This is achieved through the use of tools type programs such as wordprocessors or databases and also computer assisted learning packages which develop particular skills or knowledge in an interesting fashion.

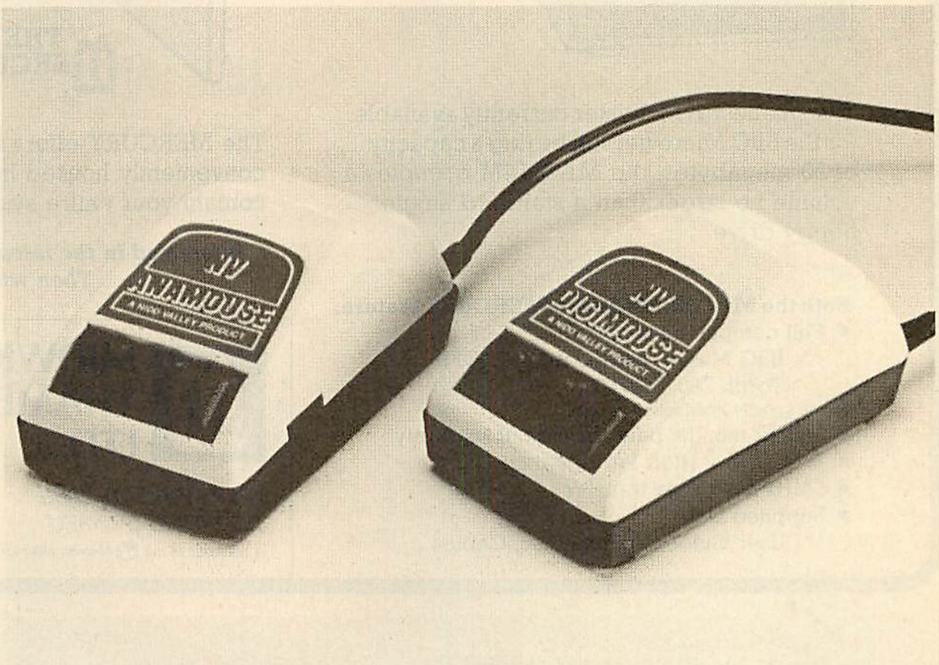
In this article there will be an attempt to advise parents about the issues facing them if they are contemplating buying computer materials for Christmas.

Many people enter the home computing market with little real idea of why they are buying a machine. The children are probably agitating for a games machine and somewhere in the back of the mind the potential buyer has an idea that the computer must be educationally beneficial otherwise the government would not spend such vast sums of money on them for schools. The outcome of this thinking is that the machine is used for games, a few educational packages are bought which the children look at once and then go back to zapping aliens.

Unless you have a clear reason for your purchase then you cannot choose appropriate machines, peripherals or software, so let's consider some fundamental computing philosophies.

Taking the obvious uses first, the computer is good entertainment. Don't be persuaded that computer games will scar your child for life. If the playing of them becomes obsessional – hour after hour, day after day in order to reach an elusive high score – then you should be concerned. After the first orgy of button-pressing most children will settle down to a steady pattern of occasional play.

Look out for signs that they have improved their general co-ordination as their skill develops. When you are left floundering on the first screen of a game and your child is happily dodging the ducks and collecting the eggs on the twelfth screen you will know that they have a skill beyond your own. Moreover, if the game involves logic and planning, look for and encourage a change in thinking processes as they plan the way to trap the spirits by moving the boulders and getting the diamonds. *Repton 2* (from Superior Software) is one of the better logical puzzle games that can give everyone hours of covert educational fun. Educational does not necessarily mean boring. Check for positive qualities in any package you buy.



Mice are one of the most liberating additions to a home computer

The second obvious use is for business. How many computer users do you know who really use their computers to do their home accounts? In my experience it is very few. So, what business uses? Wordprocessing is the most obvious but depends upon a printer. Without one, any of this type of software is useless, as are spreadsheets and databases.

Wordprocessing really is the most practical tool that you can offer any child at school age. With it they can create materials for school, prepare homework prior to writing up in longhand and generally improve their language use, syntax and spelling through the manipulation of text.

A third use for the computer is as a source of information. That information may be something that is resident in the computer's memory or on disc or it may be information gathered from outside. Other computers are waiting to be talked to and the quantity of information they carry is astounding. All it needs is your computer, a telephone line and a modem and the world is your oyster. The obvious candidate for your child's use is Prestel which offers a growing database of 250,000 pages of information relating to nearly every subject. Within Prestel are children's clubs and activities – a notable one is Club 403 in Birmingham which runs a specific education area which is updated on a regular basis. It contains news, puzzles and competitions, general knowledge and materials of interest to parents. Not only that but subscribers in that area of the country can also use the shopping facilities and have groceries and household goods delivered to the door.

Information that is resident in the computer is usually in the 'drill and practice' tradition of computing programs – look at the information, answer the questions and

get a score and then re-do the ones you got wrong. This stultifyingly boring educational software still manages to creep into the Top Five educational charts printed in our education news from time to time. However, there is a further approach.

You may remember that when you were young great store was laid by a capacity for general knowledge. This embodied a desire for children to know obscure facts of little relevance to day-to-day living but which popped up in quiz shows. Do you know when the next total eclipse of the sun is visible from Cornwall? Enterprising salesmen turned that obsession into *Trivial Pursuit* and you will not be surprised to hear that it is available as a computer game (from Domark).

If you tie in all of the above with the general education programs that were mentioned in October's article you will have a broad overview of some elements of a potential educational computing strategy for your home. Fundamentally you have to decide whether or not to treat the computer seriously. Is it a toy or is it a practical tool? If it is a toy then it is likely to go the way of all toys. If not then it needs some planning to get the best from it.

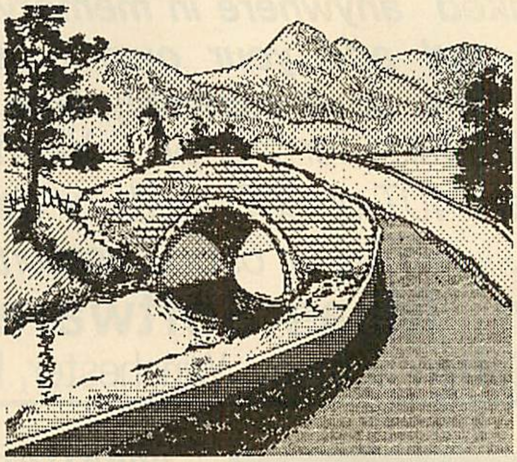
If you decide that Prestel is a useful way to spend your money and broaden your child's horizons then you should take into account a few of the consequences. First, on-line communication is not cheap. As well as the subscription charge to Prestel (£6.50 per quarter) and the phone bills (local call rate in most of the UK), there is also the connection charge (6p per minute between 8am and 6pm) and a frame charge for any page that has charge attached to it.

All of this sounds expensive. If you use the system after six in the evening and avoid charged pages however, you will have a good deal of computing value for about a pound an hour and £6.50 a quarter. It's worth remembering as well that the breadth and quality of information to which you will have access is wide ranging and quite astonishing.

By using the Gateway system, to have access to other computers which will supply a variety of information. The one springing to mind that specifically relates to home education is the ECCTIS database (Educational Counselling and Credit Transfer Information Service) which will help your child to decide on which courses in further and higher education to pursue and their location. Also the COIC (Careers and Occupational Information Centre) database which has careers information on more than 300 occupations.

ARTROOM & Master Compact

Clares Micro Supplies are supporting the Master Compact Computer from Acorn with compatible versions of their best selling packages. In addition Clares are writing applications specifically for this new machine that will utilise most of the features that it offers such as the ability to write/read two screens flexibly, improved graphics ability, and faster ADFS access. Work has already borne fruit with the launch of Artroom to coincide with the launch of the Master Compact, and as you can see today, together with Fontwise+, fantastic results can be squeezed from your dot-matrix printer. Artroom is available on disc in sideways ram or Eprom format and comes with support software in the form of advanced printer routines and ready made graphics.Great computers are no different from the others without good quality software, and we think you will agree that Artroom will help you enjoy this new machine and at the same time put it to some good use. Artroom is totally icon driven from a pull down menu, and leaves the whole screen available for use. Unlike other mouse drawing packages Artroom has been written to direct output simply to your printer and to this end every function is uncomplicated and easy to use. Almost everybody would like to be able to produce something artistic on their computers but not everybody can. Available on the support disc are a multitude of ready made images for the user to



manipulate or simply to use. This is however just a taster as future releases promise more graphics, more fonts and utilities that will enable any graphic image produced on an Acorn computer to be manipulated by Artroom regardless of mode and a quality text/graphic page/document utility to use with your own word processor. Customised logos or any other artwork can be done to order by the authors of Artroom and suggestions of topics or other ideas you would want included in forthcoming graphics discs are welcome. Needless to say the authors wrote this application on Clares Macrom Assembler and also use their other utilities such as Fontwise Brom+ and Ramrod during any software development.

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UTILITY SOFTWARE

Artroom* provides the graphics, and text is added from *Fontwise

To communicate you will also need the relevant software and hardware. A modem is a device which interprets, transmits and receives computer information. If you are only going to use it for Prestel then a simple modem is all that is needed. One may be available free if you subscribe to Micronet 800 which is a part of Prestel. This will also open up to you extra pages that are otherwise restricted as a CUG (Closed User Group). If you feel that you may need to communicate with other computers that transmit at different rates, for example on the Telecom Gold System, then you will need a more complex modem with a selection of baud rates (transmission and reception rates). The most common rates are 1200/75 (Prestel), 300/300 and 1200/1200. The first figure stands for the speed of reception of information, the second for the speed of transmission. Three hundred is roughly equivalent to a very fast typing speed. Although the practice of on-line communication may not be the cheapest computer application, it certainly is one of the more rewarding and is limited only by the scope of the system accessed.

Nearly any additional device you decide to hang on to your computer will cost a moderate amount of money. By their nature and complexity, peripherals such as printers, disc drives, monitors, plotters and all the paraphernalia of control technology

all demand a very high cost in both labour and components.

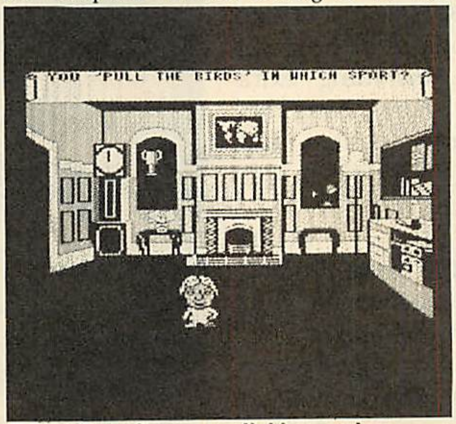
It is important to choose the right devices first time round as mistakes are expensive. To begin with printers, you may find some printers that perform marvellous feats offered at low prices. Ensure that they are not only compatible with your computer, an obvious consideration, but also with your software – not so obvious. If, for example, *Pagemaker* from AMX will not drive the printer you intend to buy then it is likely that other programs will not work.

Generally speaking, a good guide is if your intended printer is mentioned in handbooks for your software in terms of printer drivers or compatibility. The magic phrase Epson-compatible is also a guideline. If a machine is described as such then it is following an unofficial standard which has been adopted by the majority of the industry. Thus, the Canon PW-1080A, the Taxan Kaga and the Mannesman Tally have all been described as compatible with the Epson standard. Your child will need a printer that can cope with not only the standard type as output from a word-processor but can also deal with bit-image printing in order to effect screen dumps and print the multitude of fonts that are now available from companies, mostly it seems, Clares Micro Supplies (*Fontaid, Fleet Street Editor, Artroom*).

Similarly with disc drives, don't necessarily buy the cheapest available. If your dealer tells you that it is a Mitsubishi clone then it isn't a Mitsubishi. Look for names and demand a commitment to service the machine. Your child will probably give the drive a good deal of wear. If you own a Master, then be especially certain that any drive that you buy can cope with the more rapid step rates that the 1770 disc chip can generate. Many more programs now operate with frequent disc access either to load in new material or to save information that has been generated during the running of the program.

With the advent of the Advanced Disc Filing System (ADFS) and the consequent ability to format both sides of the disc to act as one continuous surface, you are well advised to consider a double-sided 40/80 track switchable drive. This will then give you ample flexibility to perform all you need to do. If you really want to go wild buy a dual drive as well. At present, perfectly respectable 40/80 drives that are double sided can be brought for under £100 – quite a bargain.

One of the most liberating devices that you can buy for your own and your child's use is a mouse. If you have not already experienced using one of these little creatures then I strongly advise that you seek out one and have a try. Apart from being a novelty in many ways, these simple pointer-movers enable you to interact with the computer without having to do vast quantities of keyboard entry. Operations that normally require the typing in of a series of commands are simply performed by moving the pointer to the relevant spot on the screen and pressing a button.



***Trivial Pursuit*, now available on micro**

Mice come in all shapes and sizes, the leader for the BBC machine is probably the AMX Mouse which has gone through several permutations.

There was originally a little criticism about this mouse which operates via a metal ball in its underside. This ball occasionally tended to slip and was fussy about the surface it ran on. However, since then a new version has emerged with a rubber ball that is altogether more positive and even in its movement.

Another early contender in the mouse race was Wigmore Megamouse, also marketed via Peartree Computers. This elegant mouse is made in a matching plastic to that of the BBC Micro case and has small buttons carefully placed to ensure maximum comfort in use. It has a rubber ball and is very smooth performer. Then there is a latecomer to the field – the Digimouse from Nidd Valley Computer Products. This mouse has stormed into the arena with a low price, good performance and a very chunky feel to it. It and the Megamouse were the first ones to be made compatible with the new Master Compact and both of course were tied in with art packages – *Artroom* from Clares and *Artist* from Peartree.

In the mouse stakes the choice is difficult as they all offer a similar product of fairly consistent quality. It's up to the purchaser to see which offers the best deal financially.

The blandishments of a whole host of computer manufacturers will assure you that their product is the most advanced and that the competition is all three years behind. As is usual in advertising, the important things are those which are not said and a few of them are to be examined in this article.

Which micro?

In your computing philosophy for you and your children you must decide whether the machine you want should be able to display sensational graphics, play beautiful music, operate more quickly than other comparable machines. The Amiga, the Atari and the Amstrad all have facilities which are fascinating and astounding. Unfortunately they tend to be like any hybrid – good at one or two things and average or below at the rest.

If you are looking for a home publishing system then you will probably buy the Apple Macintosh, but if you want a machine that can do most things very well and some superbly then you will be hard pressed to do better than buying the BBC Master Series.

Despite all the criticisms, the Master has more going for it in terms of quality software and peripheral devices that are of use to you and your child than any other machine. All of those facilities are open to you as a computer user with any of the various versions of the Master. If you have no desire to progress beyond the basic computer itself then the Compact is probably your best buy. For once, Acorn has listened to the needs of the marketplace. It is a company that has survived ordeal by fire and they had to think hard and get it right. The consumer will benefit in the long term from the reliability of this series, the compatibility of its software and the durability of its technology in an age where things run out of date with amazing speed.

Hopefully the comments on these pages will help you make some choices for Christmas. Those who have thought out their reasons for using a computer are more likely to gain the maximum benefit from their machines and, incidentally, are also likely to make the choice of a machine that will suit their needs in the first place.

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EDUCATION

THE NETWORK PAGE

Translating *Edword* to *View* and *Wordwise*, working with assembler and OSWORD calls

Robin Newman

First a thank you to all readers who have written to the Network Page since its first appearance in June. Your feedback is very useful in determining its future. The pages are intended to cover any network for BBC machines however, the majority of the comments I've received have been for Acorn's Econet system.

A letter from distant parts came from John De Figueiredo in Victoria, Australia, who uses *Edword* with good results on his level three network. John has written translator programs from *Edword* files to *View* and *Wordwise*. He has found some of the Digital Services' utilities useful, particularly *Dumps*, which allows screen dumps to the network printer even for NFS3.34, and *Fastfile*. *Fastfile* is part of a suite of network utilities sold for £75 plus VAT, which allows fast BPUT and BGET file handling as discussed in the network article in the June 1986 issue.

Digital Services supplied a set of its utilities following that article, and there are some very useful programs contained in the suite. *Fastfile* works very well, although it only works for one open file, and I found that there were problems if you tried to open a second file while *Fastfile* was active. John has found that *ViewStore* becomes usable on the network with *Fastfile*.

The Digital Services suite contains a wide variety of other utilities from Build, List and Type (similar to the disc filing system utilities) to utilities to log on or off selected machines remotely, force machines to run the same program, and one to send command strings to selected machines. Another useful one is Syscopy, which enables you to copy files between directories and to different filing systems. Programs and documentation are written to a high standard, although the package is not cheap when compared to some of the other products on the market.

One of the problems with buying utilities is that most packages contain variations on a standard spread of programs. You may like company A's Force program but prefer B's Build, Dump and List. It becomes expensive if you buy everything from everybody! To alleviate the problem, XOB is introducing a buy-your-own-mix policy. Utilities will be individually priced and you can select those you want, with prices ranging from 50p to a few pounds. You will still be able to purchase the standard packages.



Econet in action, the Redwood Publishing production desk

There are too many details to reproduce here, so if you are interested write to XOB, Balkeerie, Eassie, by Forfar, Angus DD8 1SR. Tel: (0307) 84364. Digital Services can be reached on (0705) 324934 or 159 Havant Road, Drayton, Portsmouth PO6 2AA. Who knows, perhaps Digital Services can also be persuaded to adopt the mix 'n' match approach!

Fiona Jamieson of Edinburgh brings us to our next topic. She would like to see some space dedicated to working with Econet calls from assembler. This is is not for the faint-hearted, and I think that it would be better first to see how Econet calls can be made from Basic. Fiona starts off by submitting a Basic program which is akin to * NOTIFY, but which enables you to send commands from one station to another as well.

Her program (which I have modified slightly) is well-structured, and an ideal example for exploring how to write network utility programs. All communication with the built-in network primitives contained in the network filing system ROM is by means of five OSWORD calls (numbers &10 to &14) and four OSBYTE calls (numbers &32 to &35). All of the OSWORD calls are multi-purpose, their exact function being determined by parameters associated with the call.

Fiona's program (listing 1) makes use of OSWORD &14. Although this call is specific to the network, its operation is similar to that of any other OSWORD call you may have used already eg, OSWORD &7F to read disc filing system disc sectors. All such calls rely on a parameter block. This is nothing more than a designated section of memory holding relevant information which is used by the OSWORD call.

In this example the block is set to &A00 in PROCvars. PROCsetup then inserts the relevant information into the block, using the '?' operator. This is equivalent to the Poke command in other Basic languages.

The Notify function is selected by placing a one in the first location in the parameter block. The next two locations hold the number of the station to be notified, the first location normally being zero (unless you wish to notify a station on a separate bridged network).

The second is the station number between one and 253. The following bytes contain a character string which is the command to be sent to the notified station.

In the Acorn utility *NOTIFY, the message sent is not terminated with Return, meaning that the utility is not useful for sending commands to another station. This happens because the command string is terminated with the code zero. However, by terminating the string with the code 13, which represents the Return key, it is possible to send a command to the specified machine. Table 1 illustrates the parameter block.

Address XY	
Byte	Value
0	1
1	station number low (usually 0)
2	station number high (1 to 253)
3	string to be sent to station, eg *
4	string to be sent to station, eg B
5	string to be sent to station, eg Y
6	string to be sent to station, eg E
.	
.	
n	terminating character 0 or 13

Table 1. Station notification parameter block

Lines 290, 300 and 470 in the program allow either option. The last of these lines is perhaps not too clear. If the expression (R$="Y") is true, which is represented by −1 in the BBC machine, then −13 * −1 gives 13; if it is false (represented by 0) then we get −13 * 0 =0.

Fiona does not use the alternative format for the indirection operator '?'. Thus, ?(block% + 1) is more concisely written as block%?1, and ?(block%+2) as block%?2. However beware: $(block%+3) cannot be written as $block%?3. This alternative format is widely used, and is worth getting to grips with.

Having set up the parameter block, the OSWORD call is initiated in the same manner as any other OSWORD call. The variables X% and Y% are set to point to the start of the parameter block. Since this is at &0A00, X% is set to zero, the low byte of the address, and Y% to &0A the high byte. A% is set to the OSWORD call number &14 and then the machine code entry address &FFF1 is called.

One other procedure of interest is PROCchecknet. This uses the call OSARGS, to check the current filing system. When this is called with A%=0 and Y%=0 then it returns a number in the accumulator dependent upon the filing system. The number is five for the NFS. The technique of using the USR function to extract this information is an important one which is widely used when writing network utility programs in Basic. Details of its use were given in the October 1986 Network Page.

This simple program can, of course, be expanded. For instance, it could be modified to send the same string in turn to a series of stations automatically. It has some shortcomings: for instance it will 'hang' if the destination station is protected, or not switched on, but such problems can be overcome by using additional network calls which can check whether the station is there or not, and whether it is protected, *before* sending the command. However, we will have to wait for another issue to see how that can be done.

The main use of OSWORD &14 is to communicate directly with the fileserver. It is the call used to obtain information such as the date and time, the name of the current disc and directory, or a list of stations logged on. The final listing this month (listing 2) is a program called FSTESTBED, which I developed to experiment with these fileserver calls. The program first reserves space for the parameter block, which in this case also doubles as the data area to which information is returned from the fileserver. Thus for some calls it needs to be quite large, and in this multi-purpose program &70 bytes are reserved. These are initially all set to zero in line 90, and then the user is prompted for the information to be placed in the parameter block in lines 100 to 210. The general format for the block is shown in table 2.

	Byte	Value
Address XY	0	0
	1	size of block
Tx header start	2	0 ; set to reply port number automatically
Tax header end	3	function code
	4	0 ; set up automatically to your URD channel
	5	0 ; set up automatically to your CSD channel
	6	0 ; set up automatically to your CSL channel
	7	rest of block depends upon function code

Table 2. Fileserver calling program format

In this case the first byte is zero, signifying that the call is to the fileserver. The block can vary in size depending upon the command required, which is set by the function code in byte three, and the size of the block is contained in byte one. The minimum is seven, but it will often be longer. In practice I find that it doesn't matter if you overestimate here, but you mustn't make it too short. Bytes two to six constitute what is known as a standard transmit header. Most of the values here are automatically filled in for you by the NFS ROM, and the one you need worry about is byte three which contains the function code which tells the fileserver what to do. A list of the function codes is contained in the Network Advanced User Guide, pages 65 to 70, although with not enough detail to use them all.

	Byte	Value
Address XY	0	0
	1	size of block
Rx header start	2	command code
Rx header end	3	return code
	4	rest of fileserver receive block

Table 3. Reply format from the fileserver

There are up to four different parameters which may be needed in the block depending upon the function code. PROCdecode enables the program to handle either null, numeric or string parameters as appropriate. When prompted for the next byte, if there are no more parameters to be supplied, merely hit Return. Once the block has been set up, its contents are displayed on the screen, and, all being well, the reply from the fileserver is displayed below (table 3).

The command code is zero if the operation is complete and successful. If the code is not zero then the operation would normally continue with further messages.

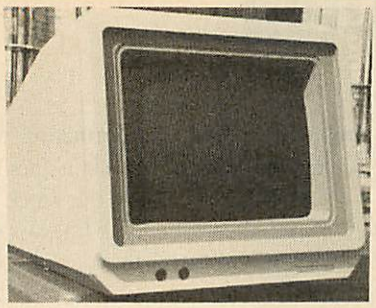
The return code is zero if no errors occurred. If not zero, the value is an error number, and it is followed by a text string describing the error eg, Bad Command.

So much for the theory. Table 4 contains

Command	Function code	block size	byte 7	byte 8	byte 9	byte 10
Read disc name	14	10	0	1	Ret	Ret
Read user names	15	10	1	4	Ret	Ret
Read date and time	16	10	Ret	Ret	Ret	Ret
Read FS version	25	10	Ret	Ret	Ret	Ret
Read free space	26	20	*	Ret	Ret	Ret

* *type in the name of your fileserver disc here, eg, DISC1 followed by Return.*

Table 4. FSTESTBED examples



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some examples to try out with the program.

The date and time and free space functions return data in a coded form. For the date and time five bytes are returned. The first byte contains the day, the second the year minus 1981 (top four bits) and the month number (bottom four bits). There follow three bytes – one each for hours, minutes and seconds. For example, 21/4/86 is encoded &15 (21 in hex), &54 (1986-1981=5, month is 4).

The free space function returns two three-byte values. The first three give the free space as a three-byte hex number, in 'units' of &100, and the second three bytes give the total disc space. You should be able to work out examples with reference to the Network Advanced User Guide.

Please keep your letters coming. You can influence what is in the network page by making your views known. In the meantime, if you want to write to network utilities, have a look at Acorn's Advanced User Guide for Econet, or get hold of Chris Dawkins' book the *Econet Micro Guide* (Longman).

```
   10 REM Network Notify
   20 REM by Fiona Jamieson
   30 REM for BBC B/B+/M/C
   40 REM connected to an Econet
   50 REM (c) Acorn User December 1986
   60 :
   70 MODE 7
   80 PROCvars
   90 PROCinput
  100 PROCchecknet
  110 PROCcheck
  120 PROCsetup
  130 PROCsend
  140 END
  150 :
  160 DEF PROCvars
  170 send$="":stattosend=0
  180 osword=&FFF1:osargs=&FFDA
  190 block%=&A00
  200 check%=2:REM Fileserver number
  210 ENDPROC
  220 :
  230 REM Input data
  240 :
  250 DEF PROCinput
  260 INPUT"Station to notify : "stattos
end
  270 INPUTLINE"String to send : "send$
  280 PRINT"Send <Return> Y/N : ";
  290 REPEAT:r$=CHR$(GET AND &DF)
  300 UNTIL r$="Y" OR r$="N"
  310 PRINT r$:ENDPROC
  320 :
  330 REM Writing to fileserver?
  340 :
  350 DEF PROCcheck
  360 IF stattosend=check% VDU 7:PRINT'"
Writing to fileserver is forbidden":PROC
bye:END
  370 ENDPROC
  380 :
  390 REM Set up block for Osword call
  400 :
  410 DEF PROCsetup
  420 ?block%=1
  430 ?(block%+1)=stattosend AND &FF
  440 ?(block%+2)=stattosend DIV &100
  450 $(block%+3)=send$
  460 length%=LEN(send$)+3
  470 ?(block%+length%)=-13*(r$="Y")
  480 ENDPROC
  490 :
  500 REM Check if an Econet station
  510 :
  520 DEF PROCchecknet
  530 A%=0:Y%=0
  540 checknet%=USR(osargs) AND &FF
  550 IF checknet%<>5 VDU 7:PRINT"Not an
Econet station.":END
  560 ENDPROC
  570 :
  580 REM Send block to station
  590 :
  600 DEF PROCsend
  610 A%=&14
  620 X%=block% AND &FF
  630 Y%=block% DIV &100
  640 CALL osword
  650 PRINT'"String sent to station ";st
attosend
  660 ENDPROC
  670 :
  680 REM Log off
  690 :
  700 DEF PROCbye
  710 *BYE
  720 ENDPROC
```

```
   10 REM Fileserver interface test bed
   20 REM by Robin Newman
   30 REM for BBC B/B+/M/C with Net
   40 REM (c) Acorn User December 1986
   50 :
   60 DIM OswCB% &70
   70 X%=OswCB%:Y%=X% DIV256
   80 A%=&14
   90 FOR Z%=0 TO &6F:OswCB%?Z%=0:NEXT
  100 INPUT"Function code number "code%
  110 INPUT"Size of block "S$
  120 IF S$="" sz%=8 ELSE sz%=EVAL(S$)
  130 :
  140 INPUT"Byte 7 "seven$
  150 PROCdecode(7,seven$)
  160 INPUT"Byte 8 "eight$
  170 PROCdecode(8,eight$)
  180 INPUT"Byte 9 "nine$
  190 PROCdecode(9,nine$)
  200 INPUT"Byte 10 "ten$
  210 PROCdecode(10,ten$)
  220 :
  230 OswCB%?1=sz%:OswCB%?3=code%
  240 at%=@%:@%=4
  250 FOR Z%=0 TO sz%+1
  260 PRINT ~OswCB%?Z%;
  270 NEXT
  280 PRINT
  290 FOR Z%=0 TO sz%+1
  300 IF OswCB%?Z%>31 AND OswCB%?Z%<127
PRINT CHR$(OswCB%?Z%); ELSE PRINT".";
  310 NEXT
  320 CALL&FFF1
  330 PRINT''"Result is:-"
  340 FOR Z%=0 TO &6F
  350 PRINT ~OswCB%?Z%;
  360 NEXT
  370 PRINT
  380 FOR Z%=0 TO &6F
  390 IF OswCB%?Z%>31 AND OswCB%?Z%<127
PRINT CHR$(OswCB%?Z%); ELSE PRINT".";
  400 NEXT
  410 PRINT':@%=at%
  420 END
  430 :
  440 DEF PROCdecode(N%,A$)
  450 IF A$="" ENDPROC
  460 IF VAL(A$)<>0 OR A$="0" OswCB%?N%=
VAL(A$):ENDPROC
  470 $(OswCB%+N%)=A$
  480 OswCB%?(N%+LEN(A$))=13
  490 ENDPROC
```

Listing 1. Makes use of OSWORD &14 for Econet and listing 2, the fileserver interface test bed

ACORN FORUM

This month Mike Barwise gets his teeth into mode 6 stripes, locating faulty RAMs, an Atom program emulator and as Electron print style selector

£5

KILL THAT MODE SIX TIGER

A really neat tip here from Cad Delworth of Edinburgh. He was using mode 6 with a coloured background and user-defined characters, and got fed up with the stripes between the text lines. Cad found out that:

VDU 23,0,9,7,0;0;0;

removes the stripes and gives you a clean image on screen.

The mechanism here is that in mode 6, characters are programmed to a height of eight scan lines including a couple of permanently blank ones (which you can't write to). Cad's VDU call readjusts this to only the six active lines, thus eliminating the stripes. Cad points out (correctly) that the resulting screen will roll, due to the total frame time no longer matching the standard 50Hz frame rate. His solution is a second VDU call:

VDU 23,0,5,8,0;0;0;

which in fact trims the 'horizontal total' register frame.

Nice one, squirrel. Your reward is a portrait of Wellington (not the same as getting the boot!).

LOCATING FAULTY RAM

Stefan Dahlin came from Gothenburg in Sweden to see us at the Acorn User Show, where he mentioned a problem with the RAM on his issue seven BBC. It sounded like a RAM fault to me, so I suggested he try reading and writing known data to this page to prove it.

Stefan wrote to me recently to confirm my diagnosis, but he has a new problem, the RAM is faulty, but which of the chips need replacing?

Good point, Stefan, and here is your answer. The Beeb uses 4516 or 4816 16k RAM chips. As each byte contains eight bits, there are eight chips associated with each 16k block of memory. This means that there are two sets of eight chips in the 32k micro: the first set covers addresses from &0000 to &3FFF, and the second from &4000 to &7FFF. The first block (in bit significance order: bit 0 to bit 7) is located at IC61 through IC86, and the second block at IC53 through IC60.

As there are eight chips per byte, it is important to find out which chip is the bad one, or you will have to replace them all, which is wasteful. Write a little routine which stores a sequence of bit changes at each location, and reads it back each time. The routine should print out any attempts where the written data and the read back data do not match. You could, of course, write all values from zero to 255 at each location, but this is very slow and quite unnecessary: writing a one (bit zero set) followed by a two (bit one set) is good, but writing a three (bits zero and one set) is silly, because you have just tested both these bits. Your series of 'poke' values should therefore be: 0,1,2,4,8,16,32,64,128. This series toggles each bit to a one in turn.

Leave some time between writing to the byte under test and reading from it, as a bad dynamic RAM can sometimes fool you for short periods. So the structure of the best routine will be, for each value, write to all locations; read and compare from all locations; if there is a discrepancy, then print address, written byte and read byte; if not continue.

As each value chosen points to a specific bit in the byte, the address and bad value will indicate which bit, and therefore which chip is duff.

In order to test all the RAM, the routine will have to be in machine code without any system calls and must test system locations without permanently destroying their contents.

Of course the central processing unit stack (page &01) cannot be tested, as you should not turn off the interrupts. I would like to see some readers' solutions to this, so get your thinking caps on and send in your discs and listings.

£10

ATOM VARIABLE STACK

Atom enthusiast Dirk Wreidt earns himself a tenner for a very nice utility (all the way from Germany) which allows the Atom programmer to emulate the Local statement on the BBC micro, and much more besides (listing 1). Dirk has provided a 127 level integer precision variable stack which works like the 6502 machine stack, it is a LIFO or 'Last On, First Off' stack. He has intercepted the Atom CLI and added the two additional commands *PUSH and *PULL. Each call is followed by one or more variable names (integer only, @ through Z) using a comma as a delimiter between variables.

Dirk points out that, as the stack is a LIFO, you must pull in reverse order the items you previously pushed, but it is perfectly acceptable to fiddle with the order, and this can be used to interchange values between variables.

The *PUSH and *PULL commands can be followed by any number of variables, separated by commas. These commands are gained by intercepting the vector of the command line interpreter at #206, #207 and therefore have to be preceded by an asterisk.

The whole thing is enabled by linking to the start address of the m/c, in this case #3B00. As it stands, the stack is able to take 127 values. If that is not enough, you can extend it up to 255 by changing lines 280 and 660. The program can only be relocated by changing zero in line 260 and re-assembling the code, as there is a vector changed.

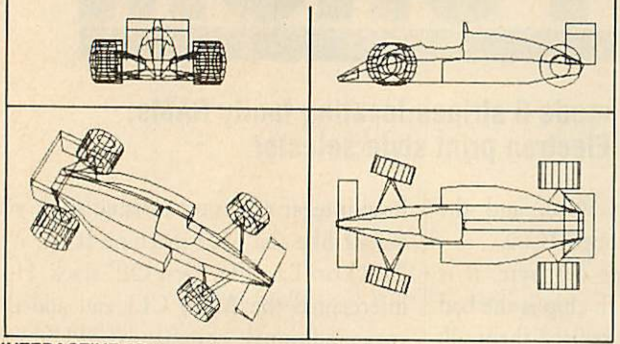
The machine code program is 187 bytes long and it uses two bytes in the zero page, #90 and #91. Location #90 contains the stack pointer, and #91 is a temporary store for the X register. The array ZZ1-ZZ4 contains the addresses of the stacks for the four bytes making up an integer variable.

This is quite a neat bit of assembler programming. My only minor grouse is that the CLI is re-entered at the COS (tape) handling point, so this routine will need to be modified for use with disc systems. This is not strictly a fair objection, however, as I happen to know that Dirk does not have disc.

The modification would not be enormous, however, to make the routine work with either system. If the CLI vector content is picked up and stored on entry to the routine, it could be used as an exit target to either COS or DOS, depending on which was in use at the time.

Perhaps someone would like to submit an update along these lines?

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```
100REM VARIABLE STACK COMMANDS
110REM FOR THE ACORN ATOM
120REM BY DIRK WRIEDT FEB '86
130REM NEW COMMANDS :
140REM *PUSH X,Y,Z,...
150REM *PULL X,Y,Z,...
160REM £90 CONTAINS STACK POINTER
170REM LINK LLO OR LINK £3B00 TO ENABLE
180REM ERROR MESSAGES :
190REM  67 STACK OVERFLOW
200REM 130 STACK UNDERFLOW
210REM 179 AND
220REM 184 ERROR IN VARIABLE LIST
230GOS.m
240E.
250mREM ASSEMBLE CODE
260O=£3B00;@=0
270DIM ZZ4,LL13
280F.L=1 TO 4;ZZL=O-L*128;N.
290F.L=0TO13;LLL=O;N.
300P.$21
310F.L=1 TO 2;P=O
320[
330:LLO\ INIT
340LDA @(LL1%256)
350STA £206
360LDA @(LL1/256)
370STA £207
380LDA @0
390STA £90
400RTS
410:LL1\ NEW CLI
420LDA @0 \ DELETE
430STA £DD\ 'FLOAD' FLAG
440LDA £100
450CMP @CH"P" \ FIRST LETTER
460BEQ LL2
470JMP £F8EF\ NOT P => OLD CLI
480:LL2\ 1ST LETTER OK
490LDA £102 \ 3RD LETTER
500CMP @CH"S"
510BEQ LL3
520CMP @CH"L"
530BEQ LL7
540JMP £F8EF\ NO SUCCESS, OLD CLI
550:LL3\ PUSH
560TXA\ SAVE X REG.
570PHA
580LDX @0
590:LL4INX      \ SEARCH
600LDA £100,X \ FOR
610CMP @32     \ BEGIN OF
620BNE LL4     \ VARIABLE
630INX\ LIST
640:LL5JSR LL11 \ GET NEXT VARIABLE
650LDA£90 \ TEST
660CMP@127\ FOR
670BNELL6
680BRK\ OVERFLOW !
690:LL6
700INC £90\ INC STACK POINTER
710LDY £90
720LDA £322,X \ COPY
730STA ZZ1,Y  \ VALUE
740LDA £33D,X \ OF
750STA ZZ2,Y  \ VARIABLE
760LDA £358,X \ TO
770STA ZZ3,Y  \ TOP
780LDA £373,X \ OF
790STA ZZ4,Y  \ STACK
800LDX £91    \ CONTINUE
810INX        \ WITH
820LDA £100,X \ NEXT
830INX        \ VARIABLE
840CMP @CH"," \ IN
850BEQ LL5    \ THE LIST
860PLA\ RESTORE X REG.
870TAX
880RTS\ EXIT
890:LL7\ PULL
900TXA
910PHA
920LDX @0
930:LL8INX
940LDA £100,X
950CMP @32
960BNE LL8
970INX
980:LL9JSR LL11 \ NEXT VARIABLE
990LDY £90      \ CHECK
1000BNE LL10    \ FOR
1010BRK         \UNDERFLOW !
1020:LL10 LDA ZZ1,Y\ COPY
1030STA £322,X     \ TOP
1040LDA ZZ2,Y      \ OF
1050STA £33D,X     \ STACK
1060LDA ZZ3,Y      \ TO
1070STA £358,X     \ VARIABLE
1080LDA ZZ4,Y
1090STA £373,X
1100DEC £90    \ DEC STACK POINTER
1110LDX £91    \ CONTINUE
1120INX        \ WITH
1130LDA £100,X \ NEXT
1140INX        \ VARIABLE
1150CMP @CH"," \ IN
1160BEQ LL9    \ THE LIST
1170PLA                \ RESTORE
1180TAX                \ X REG.
1190RTS                \ EXIT
1200:LL11 LDA £100,X \ SUBROUTINE :
1210SEC             \ CALCULATE
1220SBC @65         \ OFFSET
1230BPL LL12        \ FOR
1240BRK             \ NEXT
1250:LL12 CMP @26  \ VARIABLE
1260BMI LL13        \ AND
1270BRK             \ CHECK
1280:LL13 STX £91  \ WHETHER
1290TAX             \ IN
1300RTS             \ RANGE
1310]
1320N.
1330P.$6
1340C=0
1350F.L=0 TO P-1
1360C=C+L*?L
1370N.
1380IF C<>£13046181;P.'''$7"CHECKSUM ERROR !"';E.
1390P.'" *SAVE ""VARSTACK"" "&O" "&P'$11
1400R.
```

Listing 1. Allows the Atom programmer to emulate the Local statement on the BBC micro

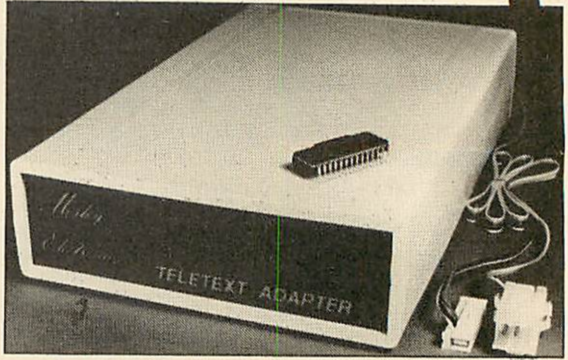
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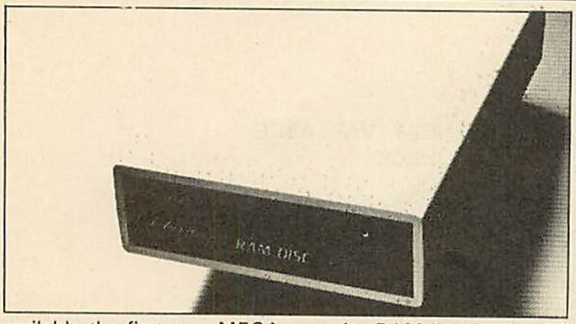
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ELECTRON PRINT SELECTOR

Listing 2 (below) is a conversion for the Electron of John Dalton's print style selector (Forum July '86), by G E Prince of Attleborough in Norfolk. He has written this for his Mannesmann Tally MT80+, which I believe is Epson compatible, so this listing should be of interest to a lot of Electron users. Thanks a lot Mr Prince, a fiver for a nice conversion.

```
   10 REM Acorn Forum
   20 REM Printer Style Selector
   30 REM by John Dalton
   40 REM for Electron with Plus 1
   50 REM (c) Acorn User December 1986
   60 :
   70 ON ERROR GOTO 920
   80 RESTORE:I%=0
   90 REPEAT:READ a$,a$
  100 I%=I%+1:UNTIL a$="END"
  110 item%=I%-2
  120 MODE 6
  130 VDU 23,1,0,0;0;0;
  140 PROCinit
  150 PRINTTAB(6)"Printer Command Selector"
  160 PRINTTAB(4,22)"Press <RETURN> to make selection"
  170 PRINTTAB(4)"<COPY> to test print,<ESC> to end"
  180 VDU 28,0,21,39,3
  190 FOR I%=0 TO item%
  200 PRINTTAB(4)"("CHR$(I%+65)")."；" ";a$(I%,0)
  210 NEXT
  220 PROCinput(0)
  230 Y%=0:X%=2
  240 REPEAT
  250 up%=FALSE:down%=FALSE
  260 VDU 31,X%,Y%,32,91,31,X%+6,Y%,93
  270 a$=GET$
  280 IF a$=CHR$(&D) PROCinput(Y%)
  290 IF INKEY(-106) PROCtestpiece
  300 IF a$=CHR$(&8B) AND Y%>0 up%=TRUE
  310 IF a$=CHR$(&8A) AND Y%<item% down%=TRUE
  320 IF up% OR down% VDU 31,X%,Y%,32,32,31,X%+6,Y%,32
  330 IF down% Y%=Y%+1
  340 IF up% Y%=Y%-1
  350 UNTIL FALSE
  360 END
  370 :
  380 DEF PROCinput(I%)
  390 VDU 28,1,21,39,19,12
  400 j$=a$(I%,1)
  410 VDU 2,1,27
  420 J%=1
  430 REPEAT
  440 f$=""
  450 REPEAT
  460 d$=MID$(j$,J%,1)
  470 IF ASC(d$)>47 AND ASC(d$)<58 f$=f$+d$
  480 IF d$="n" VDU 3:f$=FNspec(I%):VDU 2
  490 J%=J%+1
  500 UNTIL MID$(j$,J%,1)="!" OR MID$(j$,J%,1)="*"
  510 F%=VAL(f$)
  520 VDU 1,F%
  530 UNTIL MID$(j$,J%,1)="*"
  540 VDU 3
  550 CLS
  560 VDU 28,0,21,39,3
  570 IF I%=0 FOR H%=1 TO 15:PRINTTAB(1,H%)" ":NEXT
  580 PRINTTAB(1,I%)"*";
  590 ENDPROC
  600 :
  610 DEF FNspec(I%)
  620 PRINTTAB(9)a$(I%,0)
  630 VDU 23,1,1;0;0;0;
  640 INPUTTAB(9)"Enter value >"g$
  650 VDU 23,1,0;0;0;0;
  660 =g$
  670 :
  680 DEF PROCtestpiece
  690 VDU 2
  700 *FX 3,10
  710 FOR D%=1 TO 3
  720 FOR A%=32 TO 126
  730 PRINTCHR$(A%);
  740 NEXT
  750 NEXT
  760 PRINT
  770 *FX 3,0
  780 VDU 3
  790 ENDPROC
  800 :
  810 DEF PROCinit
  820 *FX 4,1
  830 DIM a$(item%,1)
  840 RESTORE
  850 FOR I%=0 TO item%
  860 READ a$(I%,0),a$(I%,1)
  870 NEXT
  880 ENDPROC
  890 :
  900 REM Error handling
  910 :
  920 ON ERROR OFF
  930 *FX 4,0
  940 *FX 3,0
  950 VDU 3,26,12
  960 IF ERR<>17 REPORT:PRINT" at line ";ERL
  970 IF ERR=17 PRINT"Printer set"
  980 END
  990 :
 1000 DATA Reset Printer to Default
 1010 DATA 64*
 1020 DATA Select French Character Set
 1030 DATA 82!1*
 1040 DATA Select Elite Style
 1050 DATA 33!1*
 1060 DATA Select Condensed Style
 1070 DATA 33!4*
 1080 DATA Set Emphasised Print On
 1090 DATA 69*
 1100 DATA Set Double Strike On
 1110 DATA 71*
 1120 DATA Select Italic Style
 1130 DATA 82!19*
 1140 DATA Set Underline On
 1150 DATA 45!1*
 1160 DATA Double Width (Enlarged) Print
 1170 DATA 87!1*
 1180 DATA Set Superscript On
 1190 DATA 83!0*
 1200 DATA Set Subscript On
 1210 DATA 83!1*
 1220 DATA Select American Character Set
 1230 DATA 82!0*
 1240 DATA Set Unidirectional Printing
 1250 DATA 85!1*
 1260 DATA Set Line Spacing (n/72) in.
 1270 DATA 65!n*
 1280 DATA Set Left Margin (n)
 1290 DATA 108!n*
 1300 DATA Set Right Margin (n)
 1310 DATA 81!n*
 1320 DATA ***,END,***
```

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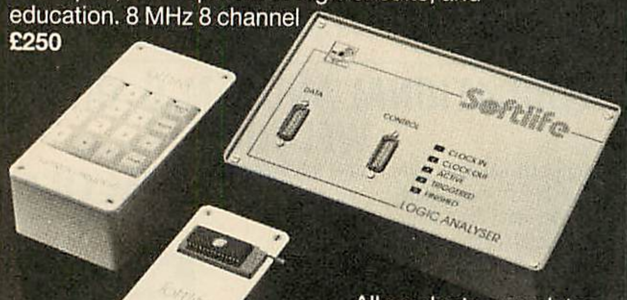
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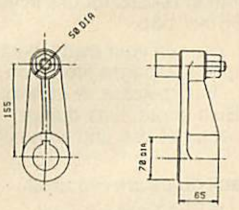
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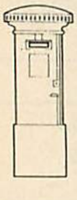
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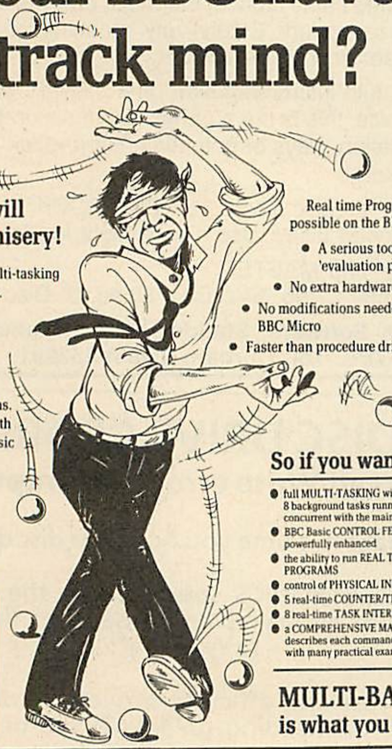
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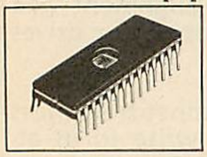
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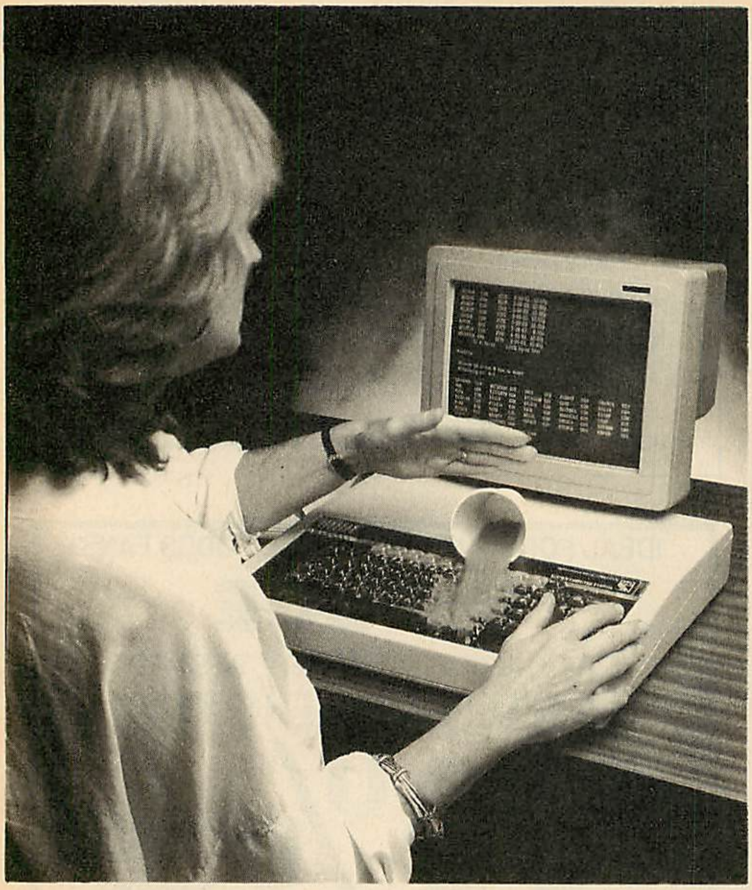
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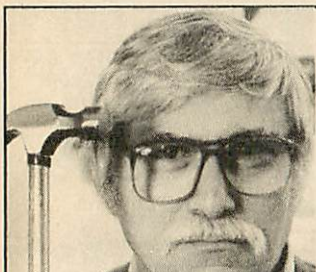
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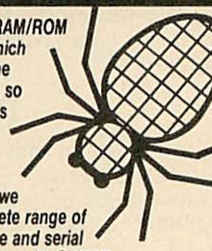
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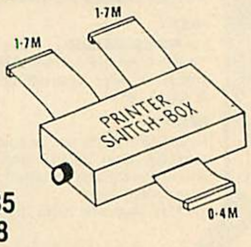
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London. Association of London Computer Clubs: Robin Bradbeer, Polytechnic of North London, Holloway, London N7 8DB

London. Association of Computer Clubs: Rupert Steele, 12 Philbeach Gardens, London SW5 9DY

London. Radio Amateur Micro User Group: Contact by bulletin board No 86300198

East London. SOBAT Computer Club: Mr T A Kayani, 12 Calderon Road, London E11 4EU Tel: 01-556 5423

North London. BBC Micro Users Group: Mr Ric Keyworth, 'The Penthouse', 4b Kilburn High Road, London NW6 5UL Tel: 01-734 9235

North London. North London BBC Micro User Group: 82 Hornsey Lane, London N6 5LU Tel: 01-263 6760 (eves)

Wandsworth. Wandsworth Computer Club: C Kendrick, Earlsfield Library, Magdalen Road, London SW16

West London. Personal Computer Club: Chris, Tel: 01-743 1579 Steve, Tel: 01-540 6271 Blue, Tel: 01-579 5415

SOUTH-EAST

Aylesbury. BBC Micro User Group: Aston Clinton County Combined School, Twitchell Lane, Aston Clinton, Aylesbury, Bucks HP22 5JJ Tel: (0296)630276

Bognor Regis. Bognor Computer Group: E R Piper, 2 Ely Gardens, Aldwick Park, Bognor Regis, Sussex PO21 3RY

Bracknell. Bracknell Primary Schools Computer Users Group: D Donaldson, Wildridings County Junior School, Netherton, Bracknell, Berks RG12 4DX

Brighton, Hove & District. Brighton, Hove & District Computer Club: J Smith, 30 Leicester Villas, Hove, E. Sussex BN3 5SQ

Bucks. South Bucks Acorn Computer Club: David Park, 160 White Hill, Chesham, Bucks HP5 1AZ Tel: Chesham 783097

Camberley. Camberley Computer Users Club: David Crosby-Clarke Tel: Crowthorne 771590, Prestel mailbox 344771590

Carlshalton. Acorn Atom User Club: Kevin Roll, 66 Shaldon Drive, Morden, Surrey Tel: 01-540 5282

Caterham. Computer Club: Caterham Leisure Centre, Godstone Road, Caterham, Surrey CR3 6RE

Dartford. CP/M User Group: Diana Fordred, 72 Mill Road, Hawley, Dartford Kent Tel: (0322) 22669

Guildford. West Surrey Computer Club: Jan Spencer, 52 Lindfield Gardens, Guildford, Surrey GU1 1TS Tel: (0483) 64512

Harpenden. Harpenden Microcomputer Group: P Crowley, 36 Southdown Road, Harpenden, Herts AL5 1PG

Harrow. Harrow Computer Group: Bazyle Butcher, 16 St Peter's Close, Bushey Heath, Watford WD2 3LG Tel: 01-950 7068

Ilford. ILBUG: Peter Jones, 1 De Vere Gardens, Cranbrook, Ilford, Essex IG1 3EB Tel: 01-554 9825

Iver. Iver Computer Society: John Haigh, 11 Colliston Walk, Ford's Farm, Calcot, Reading, Berks RG3 5ZJ Tel: (0734) 417534

North & Mid Essex. User Group (NAMEBUG): Andy Purkiss, 12 Palm Close, Witham, Essex Tel: (0376) 515609, Prestel: 376515609

Reading. Reading User Group (RUG): Richard Rowlands, Tel: Reading 596825 (eves)

South East Essex. BBC User Group (SEEBUG): Miss J Lines, 97 Oakhurst Drive, Wickford, Essex SS12 ONW Tel: (03744) 63396

Sutton. Sutton Library Computer Club: The Secretary, 21 Village Row, Sutton, Surrey SM2 6JZ Tel: 01-642 3102

Welling. Computer Users Club: Tony Latham, 69 Hadlow Road, Welling, Kent DA16 1AX

SOUTH & SOUTH-WEST

Alton. Alton Computer & Electronics Society: Kevin Weatherhead, Sheen, Old Odiham Road, Alton, Hants GU34 4BW Tel: Alton 87478

Bristol. Format 40/80 Club: BBC Disc User Group, Peter Hughes, 5 Marsh Street, Bristol BS1 4AA Tel: (0272) 799979

Fareham. Porchester & Fareham Computer Club: Simon Ward, 9a East Cams Close, Downend, Fareham, Hants PO16 8RP

Gosport. Borough of Gosport BBC Users Group (BOGBUG), Graham Dubber, 128 Wych Lane, Gosport, Hants PO13 OTE Tel: (0329) 282221 (evenings)

Radio. AMRAC (Amateur Radio and Computers): Mr T Triggel, Gleness, East Boldre, Brockenburst, Hants SO42 7WD Tel: (0590) 612130

MIDLANDS & ANGLIA

Boston. Boston Acorn Computer Users Club: J C Goodwin, 245 Church Green Road, Fishloft, Boston, Lincs PE21 ORP

Burton-on-Trent. Beeb Users' Group (Bug Club): Mrs Linda Yeomans, 13 Regent Street, Church Gresley, Burton-on-Trent, Staffs DE11 9PL Tel: (0283) 216445 (eves)

Cambridge. Bottisham Acorn User Group: Peter Rank, Tel: Cambridge 812080, or Gerald Wilcockson, 19 Gallows Hill, Saffron Walden, Essex CB11 4DA Tel: Saffron Walden 23793

Derby. The Derby Microcomputer Society: F Taylor, Secretary, c/o 5 Park View Close, Allestree, Derby DE3 2GH Tel: Derby 559334

Glossop. Glossop Computer Club (Derbyshire): T S Fox, 4 Park Lane, Little Hayfield, Stockport, Cheshire SK12 5NW Tel: (0663) 44260

Huntingdon. RAF Personal Computer Association: Sqn Ldr J A Upham, Man S (ADP), HQ RAFSC, RAF Brampton, Huntingdon PE18 8QL

Norwich. Amateur Computer Club: Andy Leeder, Church Farm, Stratton St Michael, Norwich NR15 2QB

Norwich. Norwich & District BBC Microcomputer User Group: Roy Street, Church Farmhouse, Themelthorpe, Dareham, Norfolk NR20 5PS Tel: Foulsham 579

Nottingham. Micro Club: John Day, 8 Warkton Close, Chilwell, Notts NG9 5FR Tel: (0602)225660. Pestel: 602225660

Redditch: Redditch Computer Club: Anthony Green, 14 Radway Close, Redditch, Worcs B98 8RZ Tel: (0527) 61434

Stoke. POTBUG BBC User Group: J Forrest, 50 Cliff Street, Smallthorne, Stoke-on-Trent, Staffs Tel: 818430

Stratford. Stratford Computer Club: Chris Parry, 15 Kipling Road, Stratford-on-Avon Tel: (0789) 68080

Suffolk. West Suffolk BBC Micro Users' Club: Antony Hurden, 14 Plovers Way, Bury St Edmunds, Suffolk IP33 2NJ

NORTH-WEST

Chesire. Mid-Cheshire Computer Club: Michael Christie, 496 The High Street, Winsford, Cheshire

Cumbria. West Cumbria User Group: P Majid Tel: (0946) 62732 or K Purkiss, Tel: (0946) 66586

Liverpool. Mersey BBC User Group: Nik Kelly, 56 Queen's Drive, Liverpool L4 6SH

Rochdale. Rochdale BBC Micro User Group: c/o 6 Dunbar Grove, Darnhill Estate, Heywood, Lancs OL10 3QJ

Wirral. Wirral Micro Users Club: David Walsh, 28 Prioty Close, Bebington, Wirral, Merseyside L63 3EG

NORTH-EAST

Huddersfield. Huddersfield BBC Micro User Group: S Gill, 21 Mayfair Avenue, Sowood, Halifax, W. Yorks Tel: (0422) 73058

Hull. Forum 80: 421 Endike Lane, Hull HU6 8AG

Hull. MUSE (for teachers): PO Box 43, 231/2 Friary Chambers, Whitefrairgate, Hull HU1 2HD Tel: (0482) 20268

Keighly. Keighly Computer Club: Colin Price, 'Apple Garth', The Hob Hill, Steeton, Keighly, W Yorks Tel: (0535) 54738

Newcastle. Newcastle & Washington BBC User Group (NEWBUG): Gary Bowmaker, c/o Washington Town Centre Library, The Galleries, Washington, Tyne & Wear Tel: (0783) 813175 (eves)

Sheffield. Parsons Cross BBC User Group: Andrew Grant, 28 Rokeby Road, Sheffield S5 9FU Tel: (0742) 461203

S Yorks. South Yorks Personal Computer Group: Bob Hindle, 139 Penrhyn Road, Sheffield S11 8UP

Wakefield. Wakefield BBC Micro User Group: PO Box 65, Wakefield, West Yorkshire WF2 6YZ

SCOTLAND

Econet. User Group (Scotland): c/o Michael Ryan, Balkeerie Cottage, Eassie, by Forfar, Angus

Central Scotland. BBC User Group: D Davidson, 1 Roxburgh Place, Larbett, Stirlingshire FK5 4UE Tel: (0324) 558692

Inverclyde. Inverclyde BBC Micro Users Club: Robert Watt, 9 St John's Road, Gourock, Renfrewshire PA19 1PL Tel: Gourock 39967

WALES

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OVERSEAS

Australia. BBC Users Group of Canberra: PO Box E58, Queen Victoria Terrace, ACT 2600

Australia. Beebnet: M A Cowley, PO Box 262, Kingswood, South Australia 5062

Australia. Ozbeeb Sydney, meetings North Ryde, PO Box 1030, Parramatta 2150 Tel: day 635 4868, eve 868 4455

Australia: Dapto BBC User Group: PO Box 447, Dapto, NSW 2530

Canada. Atom Users Group of Canada: John Wood, 812 Cabot Trail, Milton Ontario L9Y 3M8

Canary Islands (Spain). BBC Micro Club Tenerife: PO Box 560, 3800 Santa Cruz de Tenerife

Eire. Irish Amateur Computer Club: Austin Vaughan, 35 Monastery Drive, Clondalkin, Dublin 22 Tel: 01-593112 (eves)

Eire. OIFIG (Official Irish Fourth Interest Group): c/o Hugh Dobbs, Newton School, Waterford.

Finland. Arjen Raateland, Hopeatie 10A21, 00440 Helsinki 44

France. Club Informatique Assevent: Claude Laurent, 1 rue du Marechal Leclerc, Assevent 59600 Tel: (27) 652294

Greece. Microclub: C Mantazavinatos, 17 Stournara Str. 106 82 Athens

Hong Kong. Acorn Computer Users Society of Hong Kong: PO Box 13330, Central PO, Hong Kong

Malaysia. Sabah Computer User Group: c/o Albert Vun, PO Box 69, Kota Vun, Sabash, Malaysia

Malta. BBC Micro Users Club (Malbeeb): Ray C Zammit, 20 Oleander Avenue, Santa Lucia

Netherlands. Big Ben Club: J W Vuurpijl, Hein Baderstraat 36, 2171 XP Sassenheim

New Zealand. BBC/Acorn Computer User Group of NZ: PO Box 9592, Wellington

New Zealand. Christchurch BBC & Electron Users Group: Mrs Rebe Nolan, 87 Palmers Road, Christchurch 9

Norway. BBC INFO: Horten Ingenlorhogskole, Skippergt.6,3190 Horten

Norway. Skandinavian BBC User Group: Frans-Otto Hendriks, Ludvig Karstensvei 14, 1064 Oslo 10

Pakisan. BBC Users Group: Capt. Z A Kidvai Tel: Karachi 540986

South Africa. Acorn Atom Users Group: J G Dowling, 27 Oribi Avenue, Van Riebeeck Park, Kempton Park 1620

South Africa. Pretoria BBC Users Group: Stan Miller, PO Box 117, Montana 0151

South Africa. Tygerberg BBC User Group (Tygerbug): R P Donovan, 16 Bakker Street, Welgemoed, Bellville 7530

Sweden. Acorn User Society of Sweden: Tord Israelson, Toppa Klaras Vay 12, S-702 29, Orebro, Sweden.

Sweden: BBC User Group: Anders Wichman, Folkungagatan 58, 11622 Stockholm

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SPECIAL INTEREST

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Adventure. International Adventure Club: Simon Martin Clarke, 10 Ennis Close, Harpenden, Herts AL5 1SS

Bulletin Boards. Forum 80:421 Endike Lane, Hull HU6 8AG

CP/M. CP/M User Group: Diana Fordred, 72 Mill Road, Hawley, Dartford, Kent Tel: (0322) 22669

Disc Users. Format 40/80 Club (BBC Disc User Group): Peter Hughes, 5 Marsh Street, Bristol BS1 4AA

Education. Micros and Primary Education (MAPE): c/o Mrs G Jones, 76 Sudbrooke Holme Drive, Sudbrooke, Lincs LN2 2SF

Electronics. Alton Computers & Electronics Society: Kevin Weatherhead, Sheen, Old Odiham Road, Alton, Hants GU34 4BW Tel: Alton 87478

Heraldry Society. Colin Forrester, 5 Hook Road, Epsom, Surrey KT19 8TH

Logo. British Logo Users Group (BLUG): Richard Olney, c/o London Technology Network, 86-100 St Pancras Way, London WC1

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ACORN USER'S

DIARY

Yearly bore

As usual, the Christmas Diary sees the announcement of the Bore of the Year.

This year we are proud to award the dubious honour to Laurie Candlewick who runs the Econet bulletin board.

Laurie, always front runner, made sure of the title at a recent computer show where 50 members of the audience walked out within a record breaking 10 minutes of his start. Laurie's technique was to rabbit on about X21 and X25 protocols to an audience of mums, dads and kids out to try and enjoy themselves.

Winner of Wit of the Year for a second time is Andrew Gordon of SJ Research who knocked spots off the others.

Not Elite

Spare a thought for our reader. He phoned us up to tell us he'd brought *Elite* last month and had been playing it almost non-stop. He managed to land on some planet but hasn't been able to get off yet! (How do you land on a planet?)

New micro scoop

The Abuser Diary once again scoops the world to bring you details of a new Master series micro. Our interfering reporter Orson Fact – who was first to tell you about the Master and the Compact computers in these columns, can reveal the existence of the 128 Master.

It looks just like a Master 128 but in a revolutionary move the keypad has been re-positioned on the left of the keyboard. Ghostware bundled with the new micro is Acornsoft's *Over-View* and Second Processor *Elite*. The micro will not allow pipelining. Acorn has refused to admit anything, including the existence of the new micro.

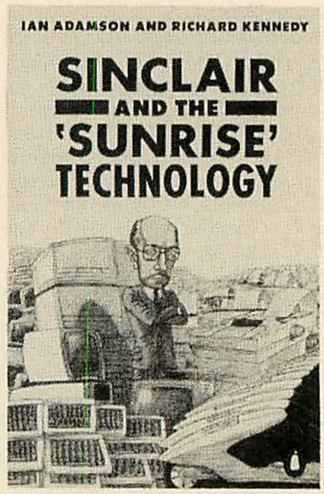
A spokesperson said it could have been a wrongly mounted slide but didn't wish to commit him or her self, and couldn't risk talking about any new BBC computers. Orson is waiting.

Network capers

The recent Econet conference produced a few chuckles. One great topic of conversation was the lack of local buffering by the NFS. To quote Kim Spence Jones, 'If your program's professionally written it should do it automatically'. Perhaps someone should inform the authors of Basic and *ViewStore*!

High or low of the day was the lecture given by Andy Finney of the BBC about the Domesday project – very important at an Econet conference, we don't think. He put the demo tape through its paces and showed us what fun it is. Of course we were all astounded to learn that there were three Welsh speaking chaps living in the vicinity of Edinburgh – a really useful application that.

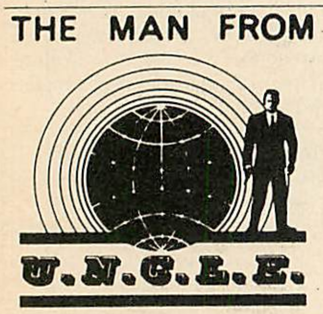
Andy couldn't bring the Domesday system with him but he did commit himself by saying it would cost more than a BBC micro. However, we can reveal to Andy that the cost of the system will be £3,800.



Guess what happened to our favourite uncle at Christmas over the past 10 years? Well, here it all is:

1985: TDP Ltd liquidated, debts £6.4m. **1984:** £4m ad campaign. **1983:** £50,000 ad campaign for flat TV. Smiths order 7000 – 300 delivered. **1982:** New flat screen TV. **1981:** Faulty ROMs in ZX81. **1980:** ROM for ZX80 withdrawn. **1979:** £7.8m losses. **1978:** £1.98m losses. **1977:** £1.29m losses. **1976:** Nothing! **1975:** Black watch.

All magic stuff from *Sinclair and the Sunrise Technology* by Ian Adamson and Richard Kennedy (Penguin), a must!



The whole *Acorn User* office had a freebie to Holland recently. Off to a big meet of the Big Ben Club at Hedel. Quite why they should attend a thrash organised by the rhythm-crazed fans of the Big Ben Banjo Club escapes me, but I suppose the fact that it was free played some part.

I refused to attend on several grounds. First, I think the banjo leaves a lot to be desired – very plunky-punk. Second, I have had more than one encounter with the lethal brew known as Old Genever, one of which left one leg shorter than the other. However, the most telling argument (or arguement as they spell it in computer manuals) was my intimate knowledge of the likely behaviour of the rest of the party.

The thought of Tony Quinn and Bruce Smith festooned with six-packs of Carlsberg Special and the colours of Liverpool and Arsenal, racing around the ferry taunting old ladies was too much.

The reputation of Britain has been sullied enough. Why Tony persists with this unruly behaviour is a mystery. It's only plastic surgery that's prevented his extradition to Belgium as it is. I think a veil should be drawn over that. Sub judice, you understand.

Anyway, enough of the headbanging, let's talk little computers. The new Compact is coming in for stick for not being very compact. Wires all over the place: RGB cable, disc drive ribbon, five volt lead – all sticking out of the back of what is supposed to be a detached keyboard. Try dropping that lot in your lap and sitting in front of the telly. More to the point, try standing up again.

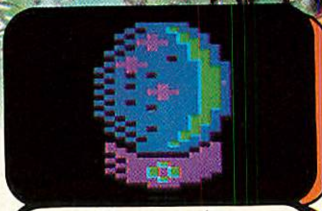




The Eerie Loading Screen



The Elf escapes from a Ravenbee



Close-up of a Crystal Ball



The Adventurer collects a Treasure Chest

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The guardians of the castle, the vicious Ravenbees have to be avoided or, in some cases, destroyed — but there is only one way to kill them; you must discover how as you venture through the dank passages of the castle. Your quest is not an easy one — only with time, experience and a little luck will you unravel all the mysteries within Ravenskull Castle.

PRIZE COMPETITION

If you are skilful enough to complete Ravenskull, you can enter our prize competition. The prizes include a £100 first-prize, with Superior Software T-shirts for runners-up.

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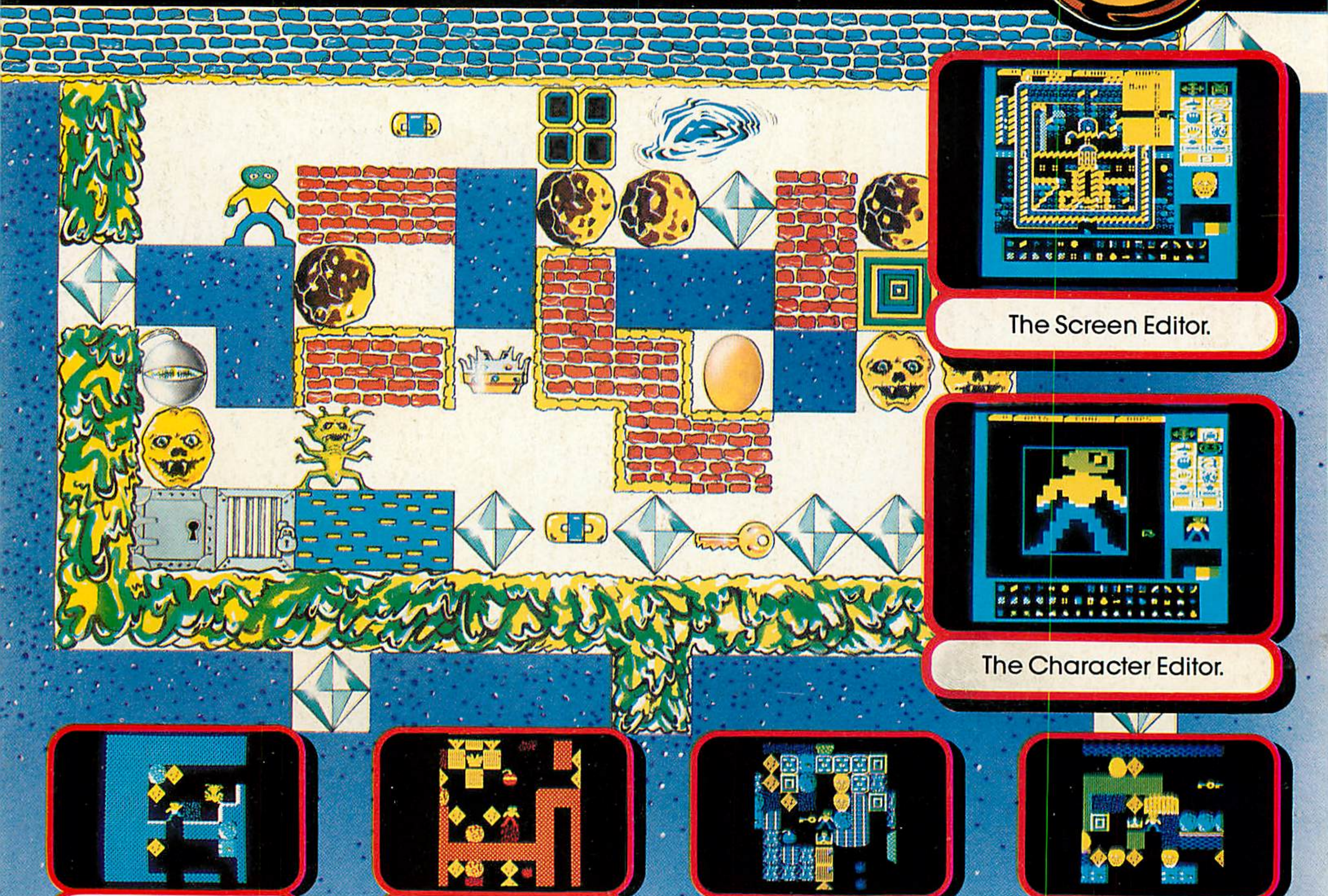
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Last Christmas saw the release of Repton 2, larger and much more challenging than before. Acorn User's Technical Editor Bruce Smith wrote: "Repton 2 is better than anything I've played on the BBC Micro or Electron. Brilliant!"

Now, completely rewritten and improved for the Commodore, Amstrad, BBC Micro and Electron, we proudly present Repton 3. For the first time, a screen-designer is included: try to devise screens that will perplex your friends, then see if you can solve their newly-designed screens. Another innovation is the character-designer which enables you to design your own monsters, rocks, eggs, spirits, diamonds . . . any or all of the game's characters can be redefined as you wish.

Repton 3 is much larger than its predecessors — it has 24 fascinating screens, and players who are skilful enough to complete them all can enter our prize competition described below. All the favourite Repton characters have been retained, together with several new features: a creeping poisonous fungus which grows at an alarming rate; time bombs and time capsules (for puzzles in the 4th dimension); and golden crowns as well-deserved rewards for your endeavours. **Can YOU complete Repton 3?**

PRIZE COMPETITION

If you complete Repton 3, you can enter our competition. Prizes include over £200 in cash, with T-shirts, mugs, badges and pens for runners-up.

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